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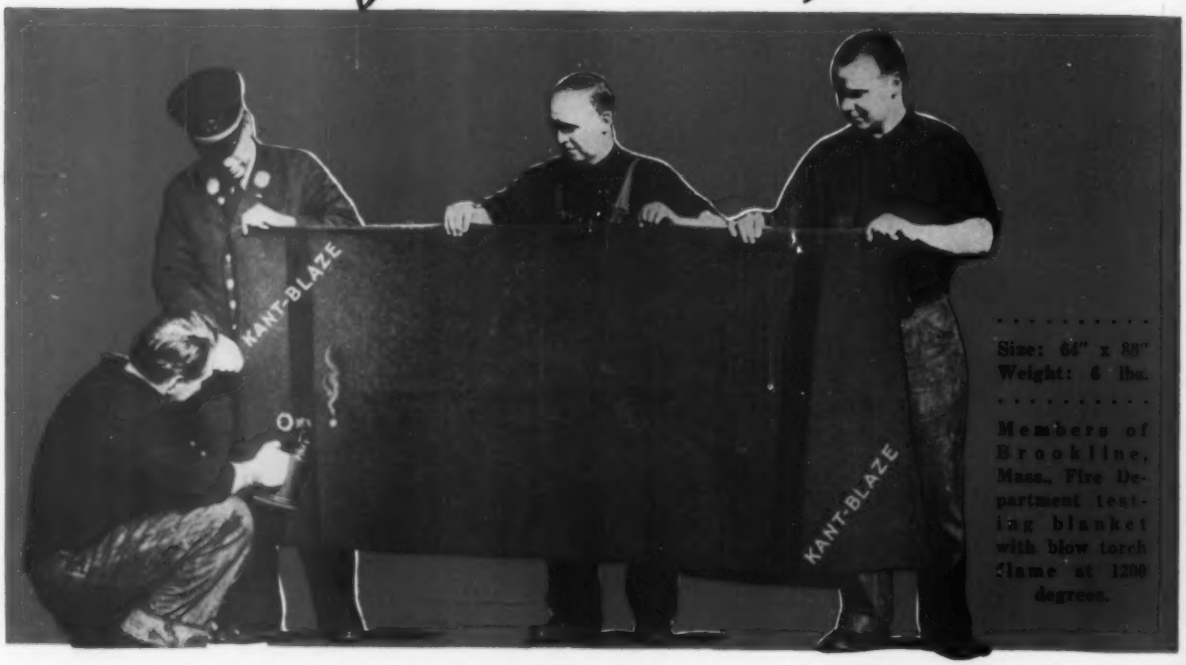
# FIRE ENGINEERING

*The Journal of the Fire Protection Profession Since 1877*

Vol. 89, No. 7 JULY, 1936 Member A.B.C.—A.B.P.

# You Need KANT-BLAZE Blankets . . . for all emergencies




Size: 64" x 88"
Weight: 6 lbs.

Members of Brookline, Mass., Fire Department testing blanket with blow torch flame at 1200 degrees.

## FOR EXTINGUISHING SMALL FIRES! FOR LIFE SAVING RESCUES!

*These 100% Flame-Proof Blankets are designed for emergency use in SCHOOLS, COLLEGES, LABORATORIES, HOSPITALS, THEATRES, CAMPS, NIGHT-CLUBS!*

KANT-BLAZE BLANKETS are folded and packed ready for instant use in a durable waterproof knapsack with shoulder straps.

HERE is a very necessary item if you want to lower fire loss — make successful rescues — protect yourself from radiant heat. A KANT-BLAZE BLANKET, thoroughly flame-proofed, will do these and many other useful things for the Fire Chief who is progressive enough to use them. Thousands of them are in daily use in fire departments everywhere. They have the approval and recommendation of leading Fire Chiefs. KANT-BLAZE BLANKETS flame-proofed 20 years ago are still rendering good service. They represent a small but very necessary investment. Their cost will likely be covered the first time you use them. The price is $15. Order from any reputable equipment dealer.

"CLOSES THE GATES TO FIRE"
KANT-BLAZE
ESTABLISHED 1910
UNITED PYRO-CHEMICAL CORPORATION

**UNITED PYRO-CHEMICAL CORPORATION**
434 UNION STREET, LYNN, MASS.

# 3 REASONS WHY LEADING FIRE DEPARTMENTS depend on

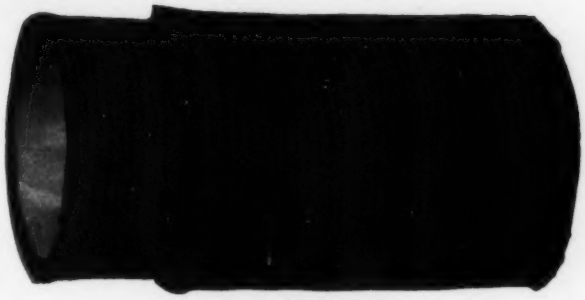
MANHATTAN Fire Hose

RADIO-ACTIVE TREATED MILDEW-PROOF

*Flat-Folding*

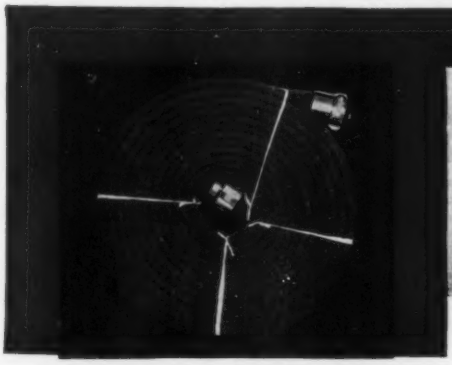
*Dependable*

*Durable*



PATENT APPLIED FOR

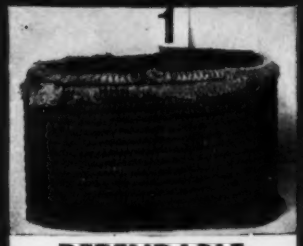
Manhattan chemists have perfected an original process for treating fire hose fabric with salts of rare earth metals which have radio-active properties. This process—exclusive with Manhattan—renders the hose mildew-proof and moisture-repellant, rot-and freeze-proof. It makes careful drying unnecessary and preserves the original strength and flexibility. Thus the useful life of Manhattan FIRE HOSE is limited only by natural wear or possible accident in use.



## FLAT-FOLDING

### Easy to Handle

Hose made in the Manhattan way not only assumes a flat shape easily for folding, but retains the maximum strength of fabric while rounded out under pressure as the hose has been finally cured in its naturally round shape. Note in illustration how compactly Flat-Folding Hose coils and folds.




## DEPENDABLE

Exhibit No. 1 pictured above proves that the dependability of Manhattan Fire Hose will never be endangered by mildew or fabric rot. This is a piece of Radio-Active Treated Manhattan Hose as it looked after having been buried for three months in a Florida swamp. It was unaffected by mildew. A sample with another treatment was badly rotted. Other stringent factory tests supplement this mildew test and service records add their stamp of approval.

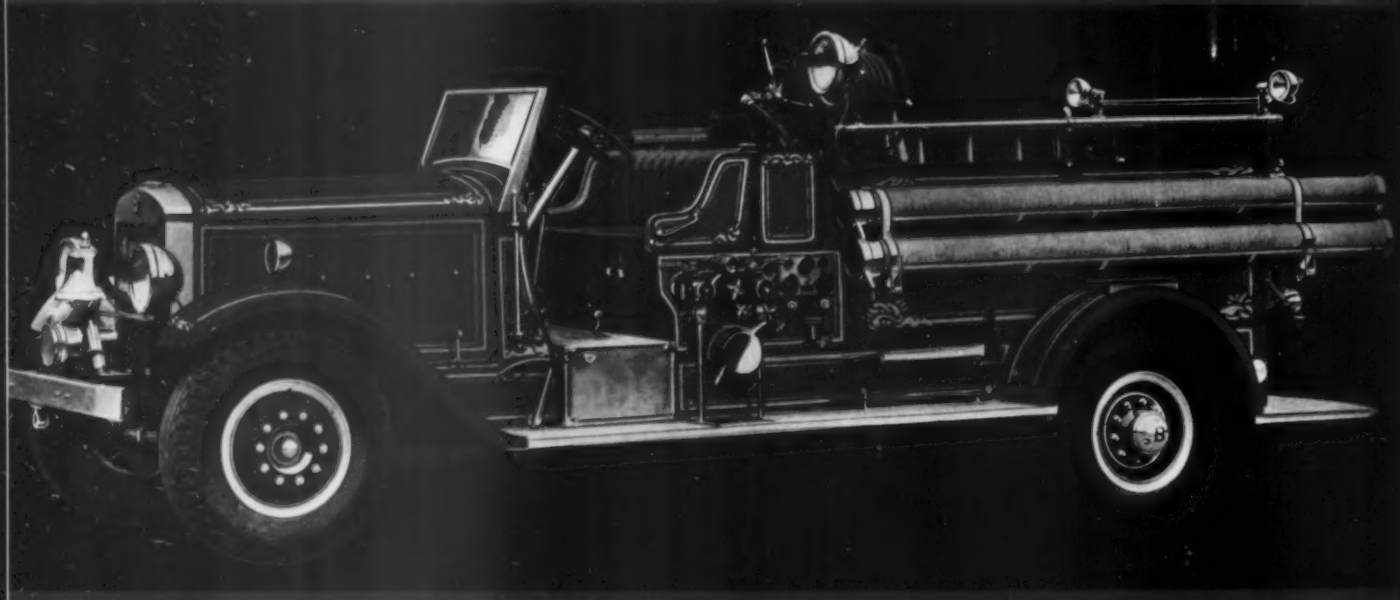
## DURABLE

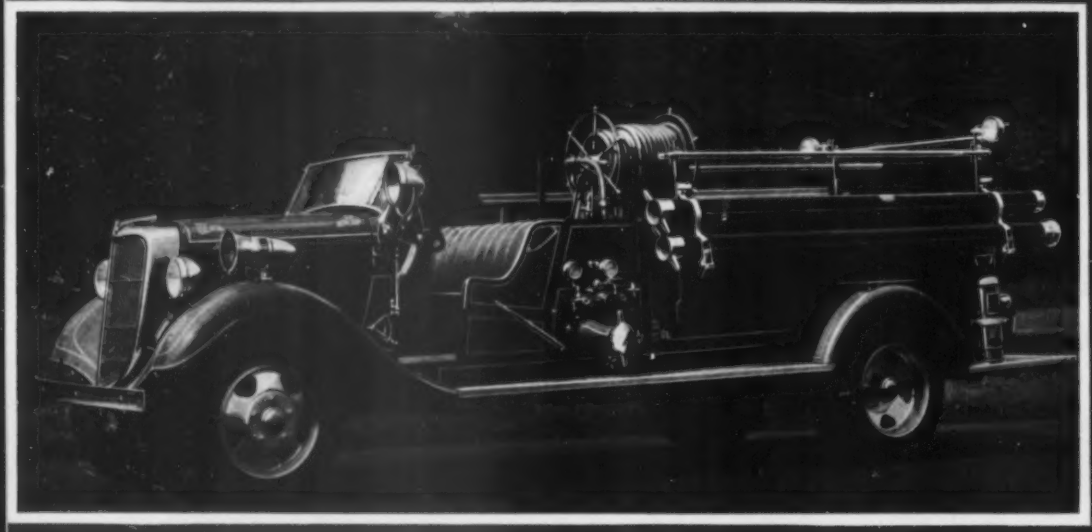
### Long Service Records

The illustration shows a length of Manhattan Fire Hose made in 1903. After 32 years it is still in excellent condition. Similar service records prove the durability of Manhattan Fire Hose — now further increased by the exclusive radio-active treatment.

THE MANHATTAN RUBBER MFG. DIVISION
OF RAYBESTOS-MANHATTAN, INC.
Sole Manufacturers of Radio-Active Treated Mildew-Proof Fire Hose
EXECUTIVE OFFICES and FACTORIES, 58 TOWNSEND ST., PASSAIC, N. J.

# BUFFALO

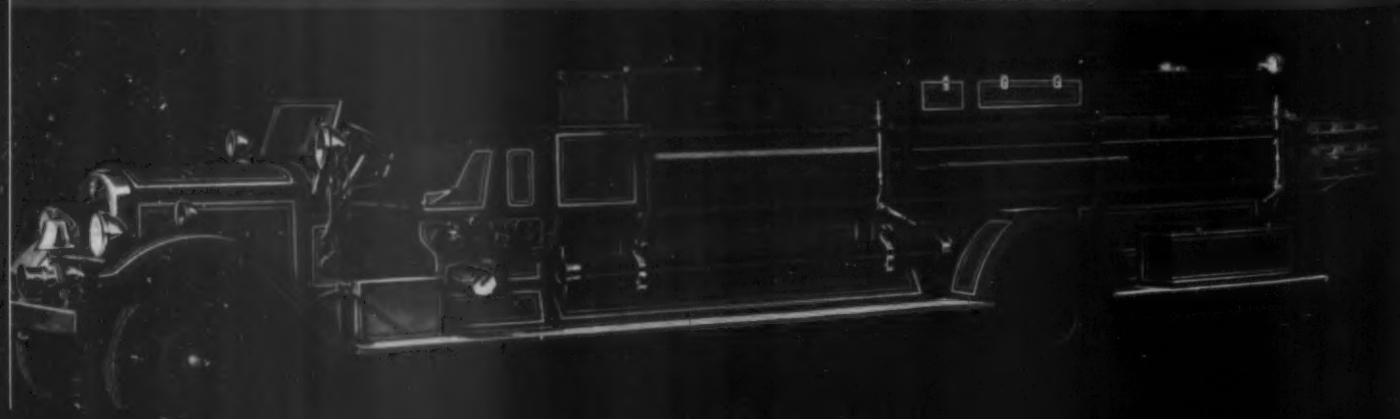




BUFFALO 1000 GALLON ... or centrifugal pumper ... adapted for larger cities. ... incorporates many advanced features, ... including illuminated operating ... throttle, motor speed, water pump ... conditioner of oil, etc. ... right next to controls, thus ... ing maximum operating efficiency ... all times; hose body with ... of 1200 - 1500 feet. Like all ... ble" fire fighters, its pump is ... sioned to exceed rated capacity ... at least 20 per cent.

BUFFALO-FORD ... gallon triple combination ... Special features include: ... of pump, compartment over ... Streeling, and twin 4" tail ...

BUFFALO 600 GALLON ... centrifugal quadruple combination ... Note radiator grille, etched ... plates for each control valve, ... ing hose body and ... ladder racks.



# BETTER BUILT FIRE TRUCKS

## *We give you* KNOWN VALUES *resulting in* SUPER-PERFORMANCE

Buffalo apparatus is built to do a job—not to meet a particular price—yet it represents one of the greatest fire apparatus values in America. Behind every piece of Buffalo apparatus there is 40 years of sound experience in the building of fine fire apparatus.

In addition, every piece of Buffalo apparatus includes such features as: Waukesha or Hercules Motors, Brown-Lipe Clutches and Transmissions, Buffalo-Hale Rotary or Centrifugal Pumps, Ross Cam and Lever Steering, Chrome Nickel-Steel Frames, Spicer Universals, Zenith Carburetors, Scintilla Magnetos, Delco-Remy Ignition, Timken Axles, Lockheed 4-Wheel Hydraulic Brakes—all "known values" and leaders in the automotive field.

We manufacture a complete, dependable line of motor apparatus, including: 500 to 1250 GPM Pumpers, Ladder Trucks, Hose Wagons, City Service Trucks, Quadruples, Triple Combinations and special types for particular needs.

Modernize safely . . . specify and buy BUFFALO Apparatus.

Literature on request.

**BUY "KNOWN VALUES"** BUFFALO FIRE APPLIANCE CORP. BUFFALO, N.Y. **GET "SUPER-PERFORMANCE"**

**BUFFALO FIRE APPLIANCE CORP.**

BUFFALO, NEW YORK

*A Consolidation of* FIRE AND WATER ENGINEERING *and* THE FIRE ENGINEER

# FIRE ENGINEERING

*The Journal of the Fire Protection Profession Since 1877*

ROBERT H. LOCKWOOD
Associate Editor

FRED SHEPPERD
Editor

N. N. WOLPERT
Assistant Editor

## Greetings

***To the International Association of Fire Chiefs in Convention assembled for the sixty-fourth time, this issue is respectfully dedicated.***

THUS FIRE ENGINEERING continues a tradition of nearly sixty years standing.

● This year your meeting is of unusual significance. The marked revival of industry and trade which has characterized the period since your last meeting—while a most welcome condition—brings with it a tremendous increase in fire hazards and potential fire losses. Factories idled by the depression are now operating at full capacity. Mercantile establishments whose stock had dwindled to the barest minimum are now carrying huge inventories. Millions of homes which were allowed to deteriorate perforce have been improved and modernized. Traffic is increasingly congested, etc. Increased activity means increased fire hazards, and increased property values portend increased fire losses.

● Has the fire service taken cognizance of this change? Have they improved and extended their facilities in anticipation of the reversal in fire loss trend which this situation indicates as inevitable?

● To be forewarned is to be forearmed. To this end, in this dedicatory issue, it is our aim to bring to the fire service and to everyone interested in minimizing fire hazards and reducing fire losses, some facts about the conditions under which firemen work and the equipment with which they are expected to achieve miracles.

● We invite your careful study of this issue and the information it contains.

*The Publishers*

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MEMBERS
Audit Bureau of Circulations
Associated Business Papers

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# Fire Trucks are SAFER . . SURER on Goodyears

On slipperiest streets or hottest pavements.

On the get-away and the straight-away run. On sharp turns or fast-going curves. For emergency stops in heavy traffic.

No other tires offer fire trucks the complete all-round protection of the Improved High Profile Goodyears.

Fire Chiefs everywhere prefer them. With Goodyears on their trucks—they are SURE of getting there—SAFER in going.

These tires are bigger, sturdier, tougher—built to the strictest specifications—built to deliver the safest, most dependable performance known.

THE GOODYEAR TIRE & RUBBER COMPANY, INC., AKRON, OHIO

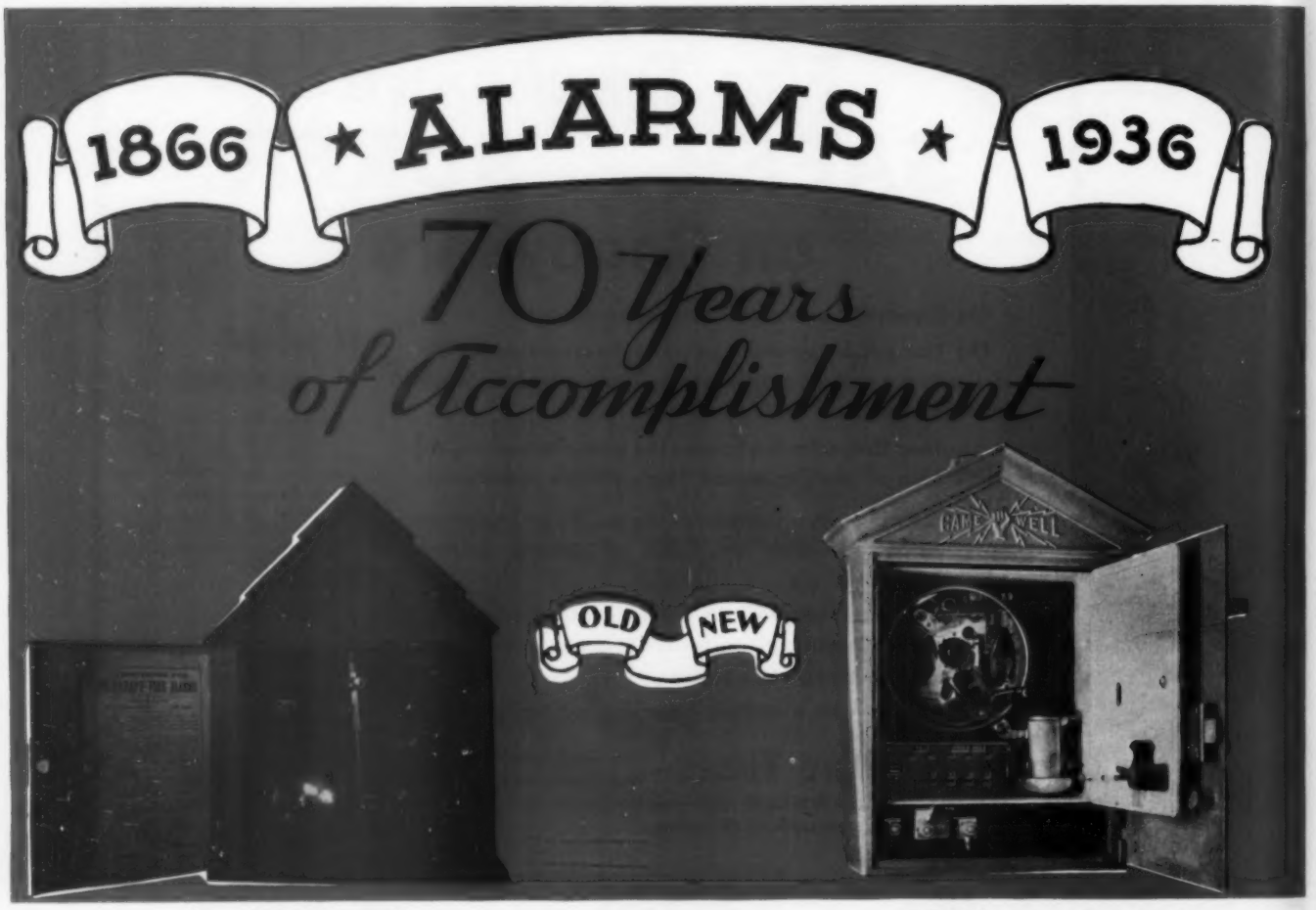
**SIX *plus* FEATURES**

● ALL-WEATHER Tread—the safest, surest, most scientifically designed tread ever developed. ● *Blow-out protection* in every ply because of Supertwist Cord, greatest known protection against tire failure of any kind. ● Extra Strong Bead Construction. ● High Profile Tread Shape—with broader, flatter, easier rolling tread. ● Tougher, heat-resisting, wear-resisting rubber. ● Longest Cotton fibre known.

***LIFEGUARD TUBES**—The final touch to complete safety. They prevent that instant let-down—that sudden swerve to right or left—when a tire lets go at high speeds—permit the driver to continue on and come to a slow, deliberate stop under full control.

*TRADE MARK REG., U.S. PAT. OFFICE

GOODYEAR
TRUCK TIRES




The original Gamewell Fire Alarm Box

3-Fold Successive Type Peerless Box with doors open

THE first fire alarm telegraph system was installed in the City of Boston, Massachusetts, in 1851.

The pioneering in this field of John N. Gamewell resulted in other installations being made during the years immediately preceding the civil War.

Interrupted during the war period, the business was resumed in 1866 by Mr. Gamewell and since then, he and his successors, The Gamewell Corporation, have been continuously engaged in the development, manufacture, and installation of fire alarm telegraph and other emergency signaling systems for municipalities and industrial plants.

The founders of The Gamewell Company realized to the fullest extent, the responsibility involved in supplying signaling systems upon which the protection of human life and property depend.

The extreme care and attention to the smallest details of manufacture and construction which characterizes Gamewell systems, is evidence that this responsibility has not been lightly assumed.

The history of Fire Alarm Telegraphy shows constant progress toward greater speed and efficiency in the transmission of alarms and certainty of operation.

## Highlights of Gamewell History

1851—Installation of the first Gamewell System.
1866—The Gamewell Company founded.
1875—The automatic fire alarm repeater developed.
1880—The non-interfering box developed.
1880—Application of telegraph to police signaling.
1883—Master Box and auxiliary systems for private properties.
1899—Application of storage battery to fire alarm systems.
1896—Positive Non-Interfering Successive Box.
1915—Peerless Single-Fold Boxes—high insulation.
1930—Three-Fold Fire Alarm System.
1936—Vitaguard Fire Alarm System for small municipalities.

***Seventy years of experience is built into the Gamewell Systems of today.***

Vitaguard Street Signal Station

Vitaguard Central Station Control and Operating Unit

The

# VITAGUARD

## FIRE ALARM SYSTEM

For small cities and towns, the latest outstanding development in the fire alarm field, embraces many new and novel features. For complete descriptive information, write the company or any of its branch offices.

## THE GAMEWELL COMPANY

*General Offices and Works:* **NEWTON UPPER FALLS, MASS.**

**BRANCH OFFICES**

Rooms 2605 and 2607
Grand Central Terminal
New York, N. Y.

1424 Park Building
Pittsburgh, Pa.

3209 Ross Avenue
Dallas, Texas

1741 Arapahoe Street
Denver, Colorado

407 South Dearborn St.
Chicago
Illinois

561 Chamber of Com'rce Bldg.
Los Angeles, California

Peters Building
Atlanta, Georgia

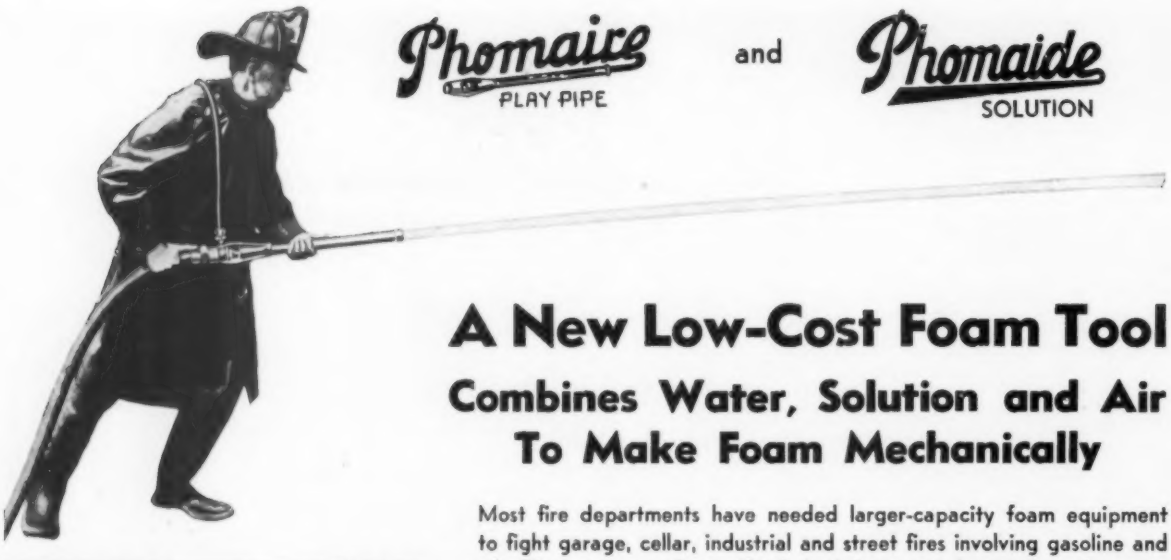
1335 Michigan Building
Detroit, Michigan

**FOREIGN REPRESENTATIVES**

Northern Electric Company
1261 Shearer Street
Montreal, Quebec, Canada

General Fire Appliances Co., Ltd.
P. O. Box 5291
Johannesburg, South Africa

Thrall Electric Co.
P. O. Box 2049
Havana, Cuba



Phomaire PLAY PIPE and Phomaide SOLUTION

# A New Low-Cost Foam Tool

## Combines Water, Solution and Air To Make Foam Mechanically

Phomaire Foam flows over the flammable liquid surface, pushes fire into corner and snuffs it.

A combination oil and wood fire. Flammable liquids are blanketed with foam and then—

—a water stream from the Phomaire Play Pipe mops up any lingering fire in the rubbish.

Most fire departments have needed larger-capacity foam equipment to fight garage, cellar, industrial and street fires involving gasoline and oil. ***Now you can have the latest foam equipment***—at low cost, producing foam by an entirely new method, mechanically rather than chemically.

This new unit, the specially designed PHOMAIRE Play Pipe, connects to your hose line (¾" to 2½"). When the water is turned on, PHOMAIDE, a new foam-making solution carried in a Hip Pack, and air are automatically drawn into the water stream in the proper proportions to form foam. Simple, isn't it!

In fact, everything about the Phomaire Play Pipe is simple. That's why it's such a valuable fire-fighting tool.

It is connected as easily as an ordinary water nozzle. The solution, requiring no mixing, is poured into the Hip Pack, and the pick-up tube is dropped into the solution. There are no moving parts, no complicated preliminaries, no confusing adjustments. And only one man is required at the Play Pipe.

Less than 20 gallons of water at a pressure of 75 pounds or more are required per minute, making it ideal for use with booster tank. This is the only foam unit available for small lines. One gallon of Phomaide Solution makes 350 gallons of foam. 300 to 400 gallons per minute may be continuously produced by merely pouring additional solution into the Hip Pack.

An unusual feature of this newest development is that a water or foam stream is optional. Drop the pick-up tube into the Hip Pack to discharge foam for flammable liquids; remove it to discharge water for ordinary combustibles.

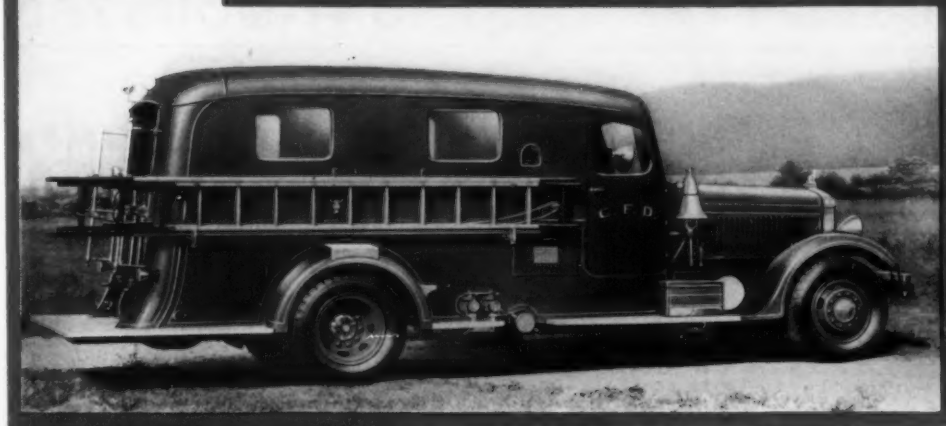
This is the biggest fire protection news you have read in ages. And certainly you want to know more about it. Without obligation, ask Pyrene to send you descriptive literature and prices on the Phomaire Unit illustrated at the left.

***Don't wait! Mail your request now.***

**Pyrene Manufacturing Company**
NEWARK NEW JERSEY
ATLANTA KANSAS CITY CHICAGO SAN FRANCISCO

# MODERNIZING WITH MACK

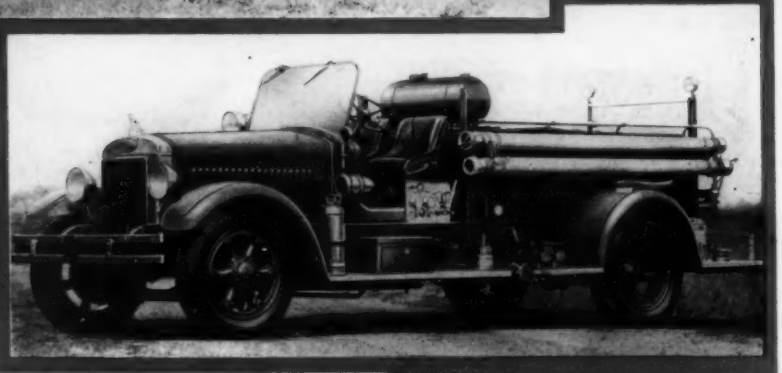
TOWN OF LAKE, WIS. —Largest fire engine in the world is this water-carrying Mack Type 95 fire-pumper. Besides a 2,500-gallon water tank, equipment includes 500 feet of 1½-inch hose, 800 feet of 2½-inch hose, and a 40-foot extension ladder. Special wide cab seats three men.

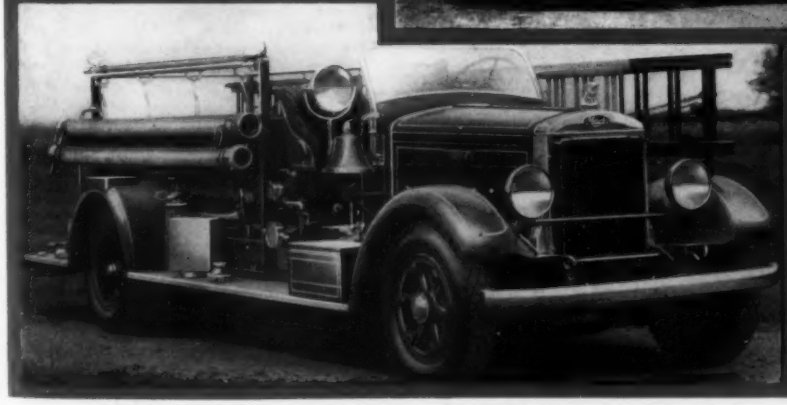


CHARLOTTE, N. C.— America's first inclosed fire engine — the Mack Fire Sedan. A tested and approved unit combining all the features of standard open type apparatus *plus* protection of firemen from injury and exposure to weather.

BOSTON, MASS. — Durability, achieved by Mack outright manufacture, is engineered into every part of the Mack Type 18, 1,000-gallon Triple-Combination Centrifugal Pumper. *(At Right.)*

FAIRFIELD, CONN.— Further proof that Mack has the facilities and resources to build the finest in fire apparatus — and *does*: Mack Type 55, 500-gallon Pressure-Volume Combination Pumper. *(Below.)*

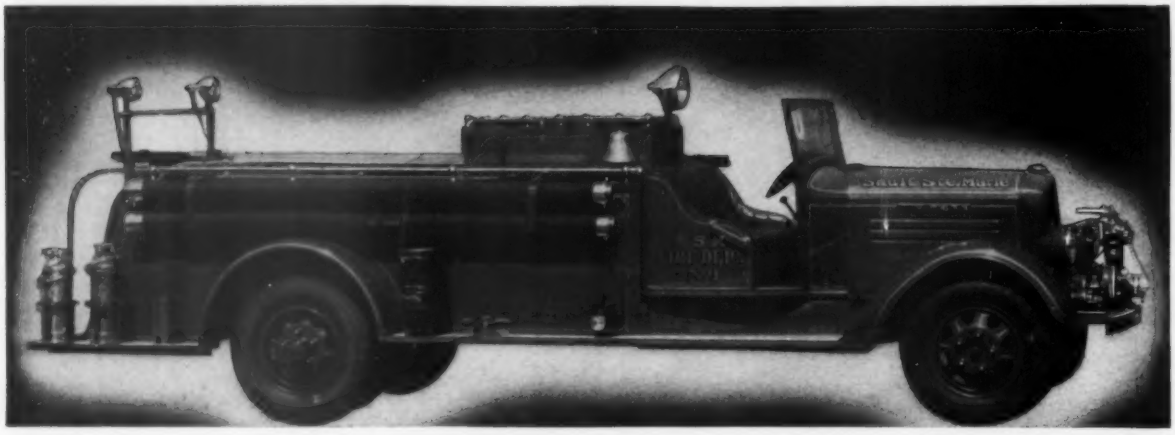




MACK TRUCKS
INCORPORATED
FIRE ENGINE DIVISION
NEW YORK, N. Y

Mack

# BARTON FIRE PUMPS



## CENTRIFUGAL TYPE . . . . FRONT-MOUNTED

### *Marvelous Performance at LOW COST!*

Barton Fire Pumps are recognized the world over as the best and most economical answer to the majority of fire protection problems.

Unlike rotary and piston types, a modern Barton Centrifugal Pump has NO PARTS SUBJECT TO DAMAGE OR EXCESSIVE WEAR when pumping the dirtiest water.

Thus with a Barton you are not limited to pumping from city hydrants. In fact, every day Barton Pumps—automatically primed—are called upon to fight country and suburban fires, delivering huge volumes of water at smashing pressures from ponds, cisterns, rivers, etc.

Any Barton Pump can be completely installed on a standard truck WITHOUT A SINGLE CHASSIS CHANGE. A good mechanic can do the entire mounting job in a few hours—entire expense but a few dollars.

**Now Edition (No. 4) of Bulletin 75 Contains Valuable Fire Stream Data**

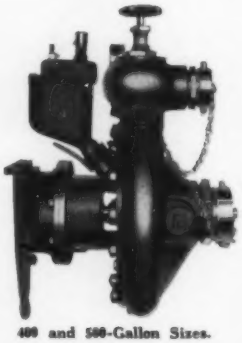
Write for your copy today! Learn about these wonderful Barton Pumps—how you can effect BIG SAVINGS and still have the finest pumping equipment. And, besides, our copyrighted Fire Stream Data will be found very useful.

350, 400, 500 and 600-Gallon Sizes.

### U-TYPE PUMPS

**with Built-in Gear-Drive for High Pressures at LOW Motor Speeds**

This is the Barton DeLuxe Line—"World's Finest Front-Mounted Fire Pumps." All sizes Underwriters' tested. All ratings based on pumping from suction. When pumping from hydrant, every size delivers far in excess of its rating. Built-in Gear-Drive means that truck motor operates at approximately one-half pump speed. With a U-Type Barton Pump wide open, THE MOTOR LOAFS ALONG UNDER NO STRAIN.



400 and 500-Gallon Sizes.

### F-TYPE PUMPS

**with Direct-Drive**

These two Barton Fire Pumps—also Underwriters' tested — have every feature offered by the U-Type Pumps, except the Gear-Drive. They are Direct-Drive Pumps, operating at direct motor speeds. This construction makes for lower cost. In fact, for 400 and 500-gallon capacities, the F-Type Pumps sell at the lowest prices on record.

***And we also build smaller fire pumps for booster service at even lower prices—ask us about them!***

## AMERICAN STEAM PUMP COMPANY

BATTLE CREEK, MICHIGAN . . *PUMPS AND PUMPS ONLY SINCE 1873*

# *The Largest Fire Hose Order Ever Placed Went to—*

# QUAKER CITY

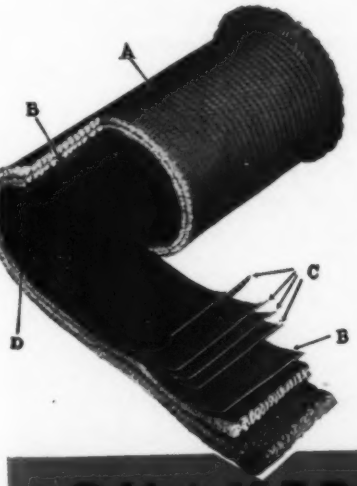
**NEW YORK CITY orders 150,000 feet of 2½" double jacket**

FILLING the world's largest single hose order, 150,000 feet, is something to crow about. It had to go to some firm whose skill and facilities were unquestioned. It came to Quaker City Rubber Co., and it was certainly a splendid testimonial to the inbuilt quality and endurance of Quaker Fire Hose and Quaker facilities for handling large orders promptly.

3,000 lengths of Quaker Fire Hose in this one order and every length more than met the specifications, not one length was rejected.

When you plan on buying new hose—whether you want one length or more, you can be certain that Quaker Fire Hose will serve you and serve you well. Play safe! Specify Quaker Fire Hose when you buy.

Over 28 miles of 2½" double jacket fire hose in one order, Quaker quality throughout.




**A.** Evenly and uniformly woven Jackets from heavy, strong, long fibre cotton, scientifically balanced to minimize elongation and twist, and to allow maximum flexibility.

**B.** Back of Rubber completely fills valleys between cotton strands. This insures smooth, non-corrugating tube through length of hose.

**C.** Tube made of four distinct calendered plies, vulcanized into one homogeneous body, eliminating pin holes.

**D.** Hand made lapped tube of live, resilient, slow-aging rubber.

WAX and GUM TREATED

***Literature on request***

**QUAKER CITY RUBBER CO.**

Frankford P. O. - PHILADELPHIA, PA.

# $21,000,000,000

## WORTH OF

# CONFIDENCE

• •

Through Central Stations serving 350 of the leading cities throughout the country, A. D. T. protects against fire, burglary and holdup, property values totaling more than twenty-one billion dollars.

This impressive figure is tangible and forceful proof of the confidence placed in A. D. T. protection services. The list of large concerns who entrust their protection to A. D. T. reads like a "Who's Who" of American business and industry. And equally significant are the thousands of smaller concerns and individual merchants, to whom a serious loss might mean ruin, who also with implicit confidence entrust their protection to A. D. T.

That this confidence is respected and justified has daily proof in the performance records of A. D. T. protection services. Over the past ten year period...

- *Properties protected by A. D. T. fire protection services have averaged 99 97/100 per cent immunity from fire loss.*
- *A. D. T. burglary and holdup protection (mercantile and industrial) has given 99 97/100 per cent immunity from burglary loss.*
- *No bank vault protected by A. D. T. has ever been successfully burglarized.*

**A.D.T. CENTRAL STATION PROTECTION SERVICES**

WATCHMAN SUPERVISORY AND MANUAL FIRE ALARM SERVICE : : AERO AUTOMATIC FIRE ALARM : : SPRINKLER SUPERVISORY AND WATER-FLOW ALARM SERVICE : : MERCANTILE AND BANK BURGLAR ALARM SERVICES : : HOLDUP ALARM SERVICE

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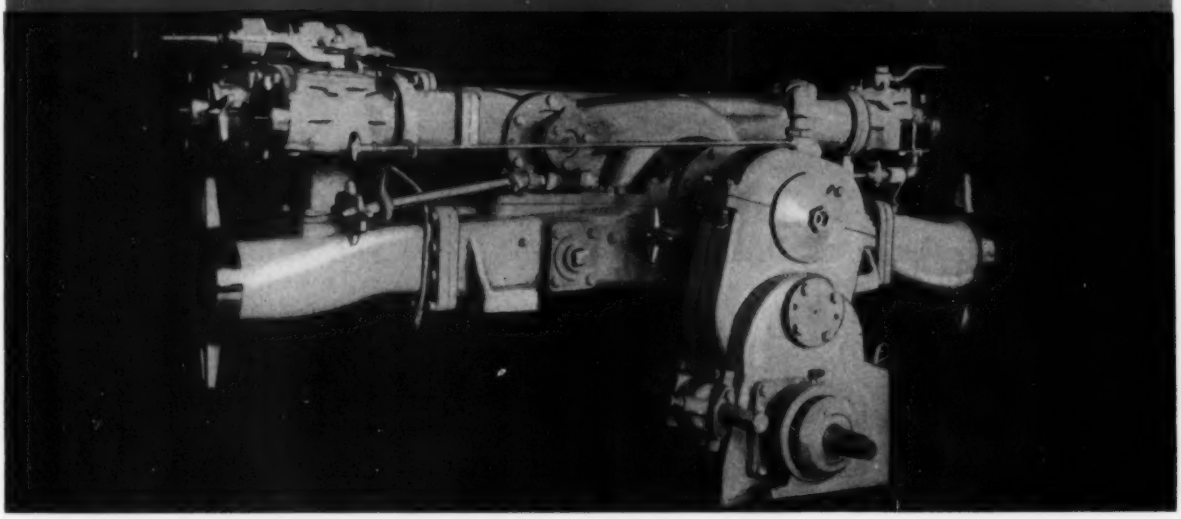

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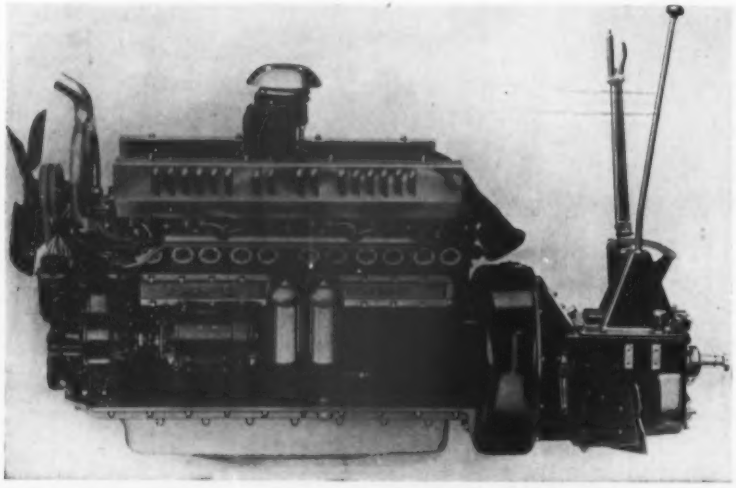

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# FIRE ENGINEERING

The Journal of the Fire Protection Profession

Volume 89 JULY, 1936 No. 7

## With the Editor

**Urgent Need for Modernization**

Elsewhere in this issue appears a review of the condition of fire apparatus now in service throughout the country. The tabulation of data on which this review was based covers nearly six hundred cities.

Probably the most alarming fact brought out is that approximately one-half of all motor fire apparatus in service today is ten or more years old. Only 40 per cent of the machines have four wheel brakes and over 20 per cent, solid rubber tires.

Much of the apparatus is admittedly in deplorable condition and, as such, constitutes a severe hazard to the protection of the city. For the public is prone to consider all fire trucks equal, no matter what their condition; should half the machines be independable, the public nevertheless thinks it has a department of full strength, whereas the strength is but fifty per cent.

It would be better to discard these old machines entirely, than to permit them to support a false sense of security.

The danger incidental to two wheel brakes alone is serious. With over 90 per cent of other vehicles on the streets today equipped with 4-wheel brakes, the fire truck which must rely on deficient equipment for stopping quickly is at a serious disadvantage.

The depression may be blamed for the plight of many Fire Departments. Necessity for cutting budgets resulted in weakening departmental manpower, and failure to replace obsolete equipment was a logical development.

Today business is picking up and factories are again getting busy—irrespective of whether the improvement has been brought about by national economic policies, or despite them. Values of materials in such plants are increasing. Fire hazards are being created.

There is therefore a rapidly growing need for better fire protection. Obsolete apparatus must be replaced with new machines; departments must be otherwise strengthened. There is no time for dallying.

Fire Departments have established a splendid fire loss record during the past 10 years. Let us assure a continuation of this performance by foreseeing the needs of the future and replacing decrepit equipment with machines that can "take it" in the event of a large fire.

Fred. Sheppard

# An Introduction to Toronto

## How the City Protects Itself Against Fire, and the Men Who Are Intrusted With the Task

By JOHN KARL LEE

The Mayor and Chief Sinclair

TORONTO is the Indian word for friend. And even as this article is being written to acquaint the visitors with the local Fire Department, arrangements are being completed for a friendly and gracious reception to those who will visit Toronto to attend the annual convention of the International Association of Fire Chiefs.

The city is located on the north side of Lake Ontario and covers an area of about forty-five square miles. It is the "Queen City of Canada," stands out with its towering skyscrapers, great wharfs and industrial plants, and is home for 750,000 persons. Here each year is held the famous Toronto exposition.

As is the case with most departments, the present organization is the outgrowth of volunteers who formed a bucket brigade. The first permanent department was organized in 1855, with a force consisting of a Chief, two Assistant Chief Engineers, two engine companies of thirty-five men each, one of thirty men, a ladder company of thirty-five men and one hose company of thirty-five men. In all there were 248 men, six manual engines, ten hose reels, 3,500 feet of hose, and two ladder trucks. Department expenses were then $17,000 a year, and the force protected a city of 40,000 persons against the spread of fire. The water supply was poor.

In 1876, the city covered nine square miles. The department had one Chief Engineer, a Superintendent of Fire Alarm Telegraph, fifty-seven men and drivers for four steamers, eleven hose wagons, three hook and ladder trucks, one salvage cart, nineteen horses, ninety fire alarm boxes and six fire stations.

Today, George Sinclair, the present Chief, is kept busy safeguarding an area of forty-five square miles, which does not include the various outside townships that often require assistance. The department now consists of one Chief, one Assistant Chief, two Platoon Chiefs, and thirteen District Chiefs, sixty Captains, sixty Lieutenants, nine Fire Inspectors, one Chief of Fire Alarm Telegraph, and one Department Surgeon. Besides about 155 officers, there are 630 firemen.

The equipment consists of twenty-two 1,000-gallon triple combination pumpers, nine hose trucks, nine ladder trucks, six aerial ladders, two high pressure companies, one salvage truck, one wrecking truck, an oil truck, various cars and trucks, one gasoline operated fireboat, one water tower for the island and an auxiliary steam tug. The department was entirely motorized in 1932.

### Division of Fire Defenses

There are nine fire districts, with a Captain and a Lieutenant located in each station. Men work on the two-platoon system—one shift is from 8 a. m. to 6 p. m., and the other from 6 p. m. to 8 a. m. In the high value district the high pressure system is in operation at all times. The high pressure district is bounded on the south by the waterfront docks, east by Jarvis Street, north by Queen Street, and west by Bathurst Street. In this area, pressure is maintained at 150 pounds and, upon direction of an officer, may be increased to 350 pounds.

### Drill School and Headquarters

Headquarters and offices are located in the heart of the high value district. The fire alarm telegraph center is located in a fireproof building at the rear of department headquarters. There is also a 75-foot drill tower where the men receive regular weekly training under the direction of the two Platoon Chiefs.

A fireproof motor repair shop, just completed, is in District 4. Here all apparatus is repaired and overhauled.

Royal York Hotel, the Convention Headquarters

It has modern equipment to take care of all kinds of repairs. Each of the nine districts has its own fire inspector, who makes periodic inspections of all buildings. The detailed reports are kept on file at the Inspection Department. If a department complaint is not taken care of within a reasonable time, legal action is taken.

Fire service on the island is taken care of by one gasoline driven fireboat and two hand drawn hose carts and pumper. Ten firemen live on the island all year. During the winter, water is drained from the mains, and in case of fire, water has to be drawn from the lake. In case of a very large fire, the water works will pump water into the mains.

The island mentioned is located one mile south of the city in Lake Ontario. It has an area of about six square miles with plenty of heavy bush. There are four hundred houses and boat houses on the island. During the summer season, about 3,000 persons live there and the ferries have carried over as many as 15,000 persons in one day. During the winter there are about two hundred permanent residents, and they go across to the city twice each day on the city ice breaker, although some walk over the ice, or skate, or use ice boats. The filtration plant for the Toronto water system is located on the island.

When a fire alarm is turned in from the island, it is received at the fire alarm headquarters in the city. At the same time the siren on the island is blown, and from the coded blasts, one can tell the location of the fire. Additional fire equipment can be taken over from the main land in the police boat in a short time for the run is but five minutes.

### Fire Alarm

About 4,000 alarms are received each year, and there are about seven second alarms.

The fire alarm is of the latest Gamewell type, costing over $500,000. The system consists of thirty-two circuits and over 950 boxes. There are special circuits to the island. Four men are employed by the fire alarm department on line work. There are also men for servicing buildings and eight operators. About sixty high pressure boxes are located in the high pressure district.

Radio is used to communicate with the Chief while he is in his car on the way to a fire. The messages are sent over the police radio. The department expects to place radio sets in the cars of all District Chiefs.

### Water System

Water at good pressure is supplied by gravity and pumps. In the residential area the usual pressure is around seventy-five pounds, and in the high pressure area it is always at 150 pounds. There is no danger of a water shortage because of the location of the pumping stations and reservoirs. All hydrants are of the three-way type. Some in the domestic zone are of the two and four-way type. Today the water system is valued at $30,000,000, and is being improved each year.

### Toronto's Worst Fire

The worst fire experienced by the city occurred April 19, 1904, when many blocks in the business district were destroyed, and the total loss was $12,000,000. The fire was discovered by a resident at 7:05 p. m., and a box pulled at King and Bay Streets. A general alarm was sounded, and additional help sent from Hamilton, Ont., Niagara Falls, and Buffalo, N. Y., by special train. Many firemen were injured in fighting the conflagration, and Chief John Thompson broke a leg the first night of the fire. It was almost two weeks before the fire was entirely out.

### Protection of the Exposition

Each year Chief Sinclair installs a triple combination pumper, manned by two men, at the Canadian National Exhibition Grounds, located in the southwest section of the city. The fair grounds spread out over forty-five acres. The exposition is housed in forty buildings of the permanent type. Two are of fireproof construction and the others are of the usual fair type. There is a grandstand with a stage over five hundred feet long. The canvas scenery measures five hundred by seventy-five feet. Each night there is a fireworks display.

Due to the excellent work of the inspectors and the personnel of the Fire Department, no serious fire has occurred during the exhibition. This is noteworthy, because during some days of the exhibition there have been more than 200,000 persons and thousands of automobiles on the grounds.

### Officers of the Department

Chief George Sinclair joined the department in 1895. He was stationed at Yorkville Avenue Station, known as No. 10. In 1930, after a rapid rise, he was advanced to Chief of the Department, and succeeded Chief William Russell, who held that office for eleven years.

Drill Tower and Part of the Department Headquarters

Assistant Chief Duncan McLain joined the department in 1895. He was District Chief in the junction distract for several years. In 1930, he was promoted to Assistant Chief.

Chief Gunn joined the service in 1891 and was District Chief for many years at Yorkville. In 1930, he was advanced to Platoon Chief.

Chief Fox joined in 1896 and was promoted to Platoon Chief in 1930.

Insurance rates were materially reduced several years ago, and today the city stands high in the low loss class.

All equipment has been thoroughly overhauled and modernized. Recently several sets of floodlights were installed.

Chief Sinclair and his assistants have devoted considerable thought to the comfort and the entertainment of the visiting Chiefs. There will be no dull moments during the convention.

The convention headquarters are located directly opposite the railway station and in the down town district.

Assistant Chief Duncan McLean

It is four minutes' walk to the Fire Department Headquarters and about ten minutes' walk from the good shopping district.

The local committee is prepared to prove that the Indians were correct in naming the "Queen City of Canada," Toronto.

## CORRESPONDENCE

### Another Form of Swindle

*To the Editor*:

Possibly the following information may prevent other volunteer departments from being victimized by false representatives of magazine publishing companies.

One of these men, equipped with imposing credentials, sold our department on the idea of sponsoring the sale of subscriptions via a letter of introduction to the residents of the fire district signed by the Chief. Many sales were made, but he accounted for only a part of them to the treasurer of the department.

Since then we have seen neither the salesman nor the magazines for which the subscribers paid a deposit.

In this particular case, the subscriber was given a receipt form on the publishing company. The company's reply to our query revealed that Mr. Smith (or whatever his real name may be) was not authorized by them to make such an offer to Fire Departments.

Granting that this affair causes us to appear slightly "suckerish," nevertheless, we are willing to humble our pride in the hopes of preventing another organization from being misled through imposing letters and recommendations.

Yours truly,
RUSSELL MOREY,
Treasurer, Fire Department,
New Hamburgh, N. Y.

### Fires at Sea

*To the Editor*:

Having spent many years around salt water, and several years in the study and fighting of fires, I trust I am qualified to at least advance a theory regarding the control of fires at sea.

Past catastrophies, notably the Morro Castle fire, have proven the inadequacy of the present system, through lack of equipment and trained fire fighters. Ships' officers and men have their work cut out for them in the handling of the vessel and passengers. The answer lies in proper equipment, adequate alarm system, trained fire fighters, and by no means least, co-operation between the bridge and the Chief of the fire-fighting forces.

Proper equipment would consist of standpipes at strategic points throughout the ship, other fire-fighting devices, fire screens and bulkheads, and an alarm system.

The fire-fighters force would consist of men carefully selected for the job through their training as firemen and their knowledge of ships and small boats. These men would be subject to all fire calls, with a three platoon system of patrol, thus insuring early discovery of fire. No other duties should be imposed upon these men.

Co-operation between the bridge and the Chief of the fire-fighting forces would consist in changing the course, or maneuvering the ship, to eliminate all forced draft, or to control the draft so it would assist in control of the fire. Some of the crew, if available, should be assigned to aid fire fighters, subject to orders of the trained men.

In such a set-up it would be essential that the man in command of the fire-fighting forces have sufficient knowledge of the difficulties of maneuvering a vessel under various conditions.

Given the above, and the application of the principles of ventilation and other fire-fighting methods practiced on land, few fires at sea should develop into more than "just another fire."

Naturally, there would have to be United States laws covering equipment, ratio of firemen to passengers, etc. These men should not be rated at a dime a dozen.

Respectfully yours,
PERCY G. SNELLING,
Ex-Chief,
Carmel, N. Y., Fire Department.

## Training Bill Approved

House Bill No. 219 which provides for the training of Louisiana firemen has passed both branches of the Louisiana legislature. The measure provides for a special fire college at Louisiana State University.

## Shire Heads Missouri Valley Group

Chief Daniel H. Shire, Mason City, Ia., was elected President of the Missouri Valley Association of Fire Chiefs, at the second annual convention held at Davenport, Ia., June 22 and 23. There was a total of 128 persons registered.

Jay W. Stevens, in addition to giving a talk on "For the Good of the Organization," spoke at a meeting of the local Rotary Club.

Mayor Merle Wells and Edward Frick, Chairman of the Fire Committee at Davenport, were voted honorary members.

Following are some of the talks that were given:

"A Layman's Observation and Appreciation of the Fire Service," J. Burr Taylor, Special Representative, Western Actuarial Bureau, St. Louis, Mo.

"Generalities," Chief John J. O'Boyle, St. Louis.

"Obtaining Effective Fire Streams," Clarence Goldsmith, Assistant Chief Engineer, National Board of Fire Underwriters, Chicago.

"What a Training School Is Worth to a Fire Department," Assistant Chief Thomas J. Hardwick, Kansas City, Mo.

"Fire Fighting as Practiced in a Small City," Chief Emil A. Johnson, Boulder, Col.

"Use of Gas Masks in the Fire Service," George Knoll, Chicago.

"Value to be Received by a Volunteer Fire Department Making Inspections," Chief F. M. Gunderson, Oelwein, Ia.

"The Organization and Operation of a Volunteer Fire Department," Chief H. A. Stanton, Storm Lake, Ia.

"Motor Fuels and Their Relation to Performance," C. F. Kautz, Ethyl Gas Corp., Cedar Rapids, Ia.

"Fire Prevention," Chief Hugo R. Delfs, Lansing, Mich.

Through the courtesy of Mayor Wells and Chief Kelley, the Chiefs were guests at a banquet on Monday evening. A party, including dancing, was given at the Zoeller Brewery.

Other officers elected are Chief A. W. Olsen, Omaha, Neb., First Vice-President; Chief E. A. Johnson, Boulder, Col., Second Vice-President; Chief Ray Tiller, Waterloo, Ia., Secretary-Treasurer; Chief James T. O'Donnell, St. Louis, Mo., Director to I.A.F.C.

Since the first convention, the following members have died: Chief M. S. Ball, Florence, Col.: Chief C. R. Dailey, Colorado Springs, Col.: Chief Frank J. Osterttag, Burlington, Ia.

The time and place of the next convention will be decided by the Board of Directors.

## Care in Driving

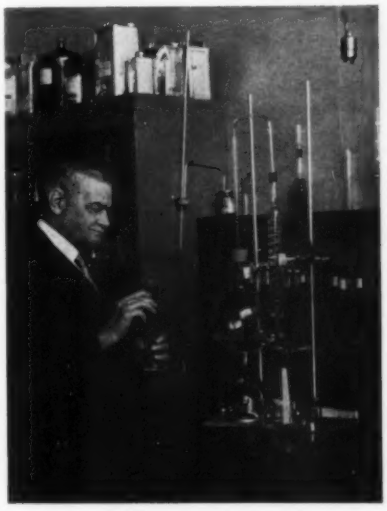
Orders issued by the New York Fire Department urges care in the driving of fire apparatus and cars. The following rules were sent to all companies:

1. Keep the apparatus always under control.
2. In the absence of traffic policemen, when approaching street crossings, against traffic lights, use every precaution.
3. Drive through a one-way street against traffic in responding to fires **only** when it is impossible to avoid it, but never when returning from fires.
4. Avoid streets where there are elevated railroad columns whenever possible.
5. A company must proceed with extreme caution when it has been delayed in leaving quarters in response to an alarm of fire, or while en route thereto, or if for any reason the normal route to a station is changed, due to street repairs, excavations, etc., as other companies responding to the same station will not expect to meet the delayed apparatus.'

## Arson Detection and Incendiary Investigation Simplified by

# Modernized Laboratory Methods

By GEORGE O. MANSFIELD
Detective Inspector, Massachusetts Department of Public Safety



**Chemical Examination**

Dr. Perlin L. Charter, chemist, is examining rags believed to be soaked with inflammable liquids. Through a process of distillation, he found gasoline. The color, flash point and specific gravity of this particular type of gasoline, helped solve the case.

NOW is the time to modernize.

This suggestion, to which the current issue of FIRE ENGINEERING is dedicated, is a most timely one. It furnishes plenty of thought not only in the work of extinguishing fires, but also in its prevention. Fires of incendiary origin come within the class of preventable fires and the most effective method of prevention is the apprehension and conviction of those who set such fires. Consequently, Fire and Police Departments can take no greater step in the line of modernization than to organize and maintain well-trained arson squads.

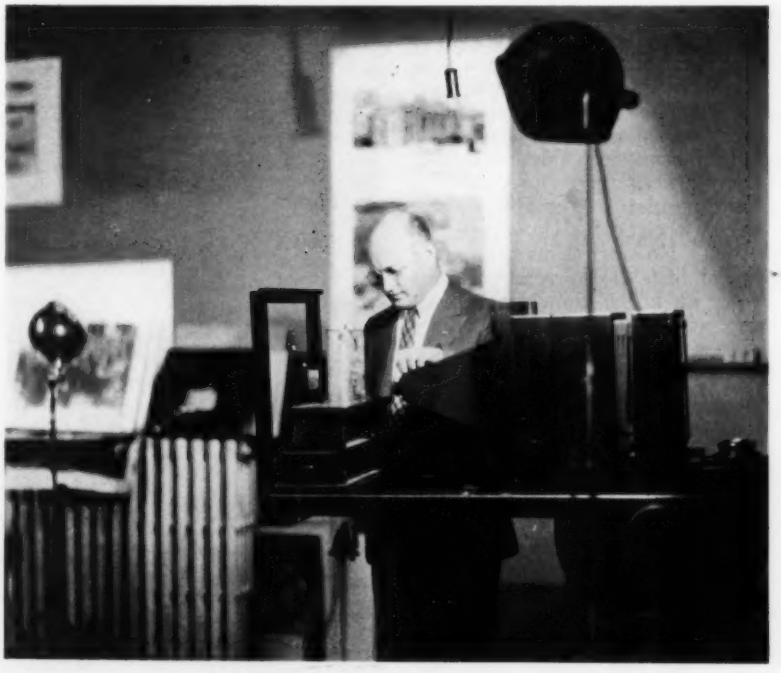
The fire bug of today is clever and has adopted many unique means of carrying out the illicit practice of incendiarism. Officials charged with the duty of preventing such fires and apprehending the arsonists endeavor to keep in advance of such criminals by equipping their departments with the most modern means of solving such crimes.

The State Fire Marshal's Division of the Department of Public Safety of Massachusetts is a striking example of one which has been thoroughly modernized in waging a successful campaign against the "fire bug." State Fire Marshal Stephen C. Garrity, through the wholehearted cooperation of Col. Paul G. Kirk, Commissioner of Public Safety, has given his men every modern means known to criminal investigation as a weapon against the fire bug. Officials throughout the country could profit greatly if they adopted some of the modern methods used by the Massachusetts department.

That it pays to modernize has been clearly proven by the unusual record of convictions which the Massachusetts department has made. Many difficult cases which appeared hopeless were solved through the aid of the expert assistance rendered by the members of the laboratory staff of the Department of Public Safety of Massachusetts. The complete resources of the laboratory are daily available to the Fire Marshal's Division. Chemistry, photography, fingerprint identification, photomicrography, ballistics, writing identification and numerous other specialties have been used to advantage.

One of the most recent aids used in the investigation of evidence in arson cases is the spectrograph. This is an optical instrument for analyzing and recording colors. It is essentially an arrangement of a quartz prism which breaks up a light source into its components and records these upon a strip of photographic film. The operation of the spectrograph is almost automatic. Its results are accurate and independent of the investigator. There are several general uses to which the spectrograph may be put.

First, it may be employed to



**Photomicrography Is Often Used**

Sergeant J. Warren Toelken, in charge of the Massachusetts Department of Public Safety Bureau of Photography, is making a photomicrograph of a fingerprint on a can found at the scene of a fire.

**The Spectrograph Which Detects the Presence of Metals**
Dr. Joseph L. Walker and the department's spectrograph. Lines of light, which are characteristic of materials tested, are photographed on plates.

analyze a substance for its metallic elements by means of an electric arc. The result is known as the arc spectrum. An arc is made between two iron or carbon electrodes and the substance to be analyzed introduced into the arc. The metallic elements impart characteristic colors to the arc and these are recorded as lines having a definite numerical position on the photographic film.

### Detection of Metals

Each metallic element, such as sodium, potassium, lead arsenic, mercury, chlorate of potash, aluminum powder, aluminum dust, magnesium powder, magnesium dust and other similar articles give lines with a definite position on the film. These lines are specific for the element in question. No other elements can give identical lines. If several elements are present in the same sample, each is reported by its characteristic lines and does not interfere with the others.

The amount in concentration of the material necessary for an accurate analysis is extremely small, in most cases far below that which is necessary for an accurate chemical analysis by the usual chemical methods. Consequently, the smallest particle of material picked up at a fire would be sufficient to use in the spectrograph operation.

The second important use of the spectrograph is in conjunction with an instrument knowns as a photometer. By this means the "absorption spectrum" of a colored liquid may be obtained. The white light from a standard source, such as an electric spark, is allowed to pass through the liquid in question and the colors are reflected onto the film. Thus, dyes, alkaloids or even blood may be identified through this means. The special feature of this process in arson work has been found to be the comparison of colors contained in gasoline with the identification of the type of gasoline, thus making it possible to locate where the gasoline was purchased with the possibility of having the purchaser identified. The same is also true of paints and other inflammables found at the scene of fires.

Another valuable use of the spectrograph is that of making an analysis of traces of dust and small particles of materials found in the debris of an incendiary fire as, for example: Sweepings from the floor at the scene of an incendiary fire were found to be identical with the sweepings removed from the soles of the suspect's shoes; in another case, small particles of broken glass were found to be the same as glass from a broken window at the scene of the crime.

### X-Ray and Fluoroscope

Another of the modern instruments which has recently been added to the laboratories of the Department of Public Safety is a portable X-ray unit and a fluoroscopic table. The X-ray is usually associated with medical work but, like many other scientific instruments, it has been found valuable in the field of criminal investigation. The instrument with which the Department of Public Safety is now equipped is portable with a wide range of adaptability, simple to operate, and shock-proof. Its safety is due to the oil immersion of the X-ray tube, which is contained in a unit, not only compact, but thoroughly safe. It is adaptable for use not only in the laboratory, but also in the field.

**Photostat Machine in a Corner of the Department's Photographic Department**

One of its great uses in arson work is the examination of incendiary bombs. In conjunction with the fluoroscope, the operator can look through a package which may contain a bomb and plainly observe what is inside. By this method, bombs can be discovered and explosions, which would occur when the package was unwrapped, are prevented. Materials which have been secluded within walls and behind partitions can be located by the use of this instrument. Also, it is possible to make radiographic pictures of bombs to have a permanent record before the article is taken apart by experts.

### Combustible Gas Detector

The detection of inflammable or explosive gas air mixtures is something which has usually been limited to the prevention of explosions, but, today, by the use of instruments known as combustible gas indicators, the presence of inflammable and explosive mixtures at the scene of incendiary fires are now discovered by the use of the "gas detector." Fire bugs, today, usually make use of highly inflammable fluids which are volatile and, because of their volatibility, explosive mixtures result from these liquids, when the gas is mixed with air. These explosive mixtures are not always destroyed and many times are pocketed in a drain or between partitions.

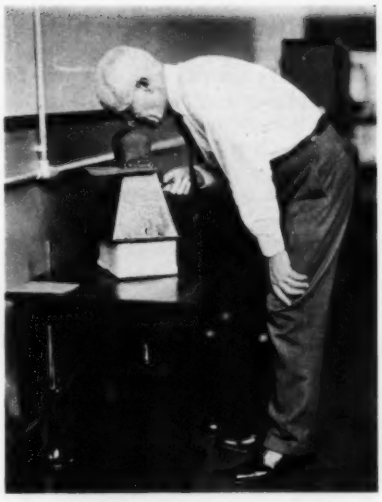
### Odor Determination

The odor created may be detected by the sense of smell, but by the use of the "gas detector" recording instrument it can positively be proven that an explosive mixture is present. The instrument which is used by the Department of Public Safety in Massachusetts is portable and can easily be handled by non-technical operators, as readings are direct in terms of explosibility. There is safety in operation, for it is thoroughly sparkproof as only dry cell batteries are used and these are thoroughly insulated.

A coil of hose is attached to the detector and this may be inserted into pipe drains and between partitions. The instrument is very accurate and furnishes positive evidence that can be presented in court in the prosecution of an arson case.

### Photography and Photomicrography

Photography is one of the most essential features of modern arson detection. Setups, trailers and fire traps found at the scene of incendiary fires can only be properly recorded by means of photographs. The many photographs already published in connection with the series of articles on the "Crime of Arson" plainly demonstrate the value of this feature; but taking one step farther in advance work, photomicrography is one of the most valuable assets in crime detection.



**X-Ray and Fluorscope**

Capt. Charles Van Amburgh, explosive and ballistic expert of the Massachusetts Department of Public Safety, looking through a package to determine whether it contains a bomb. The Fluoroscope is held above while the X-ray set is beneath the table.

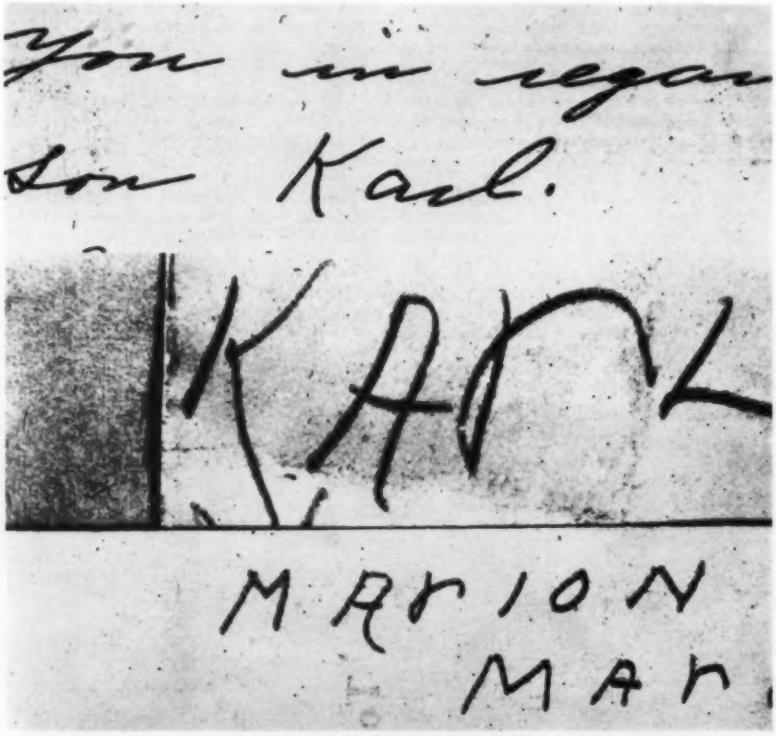
### Fingerprint Pictures

By this means fingerprints found on containers used to carry inflammable fluids at the scene of crime, may be photographed and enlarged, while small particles picked up at a fire may also be recorded by photomicrography.

Marks made by a chisel in constructing a fire trap were found to be identical with marks made on a similar piece of wood found in the pocket of the suspect, when arrested. A small particle of plaster found on the end of a crowbar used to rip holes in a wall to set a fire was found to be of the same type as the plaster in the wall where the holes were made. The color of the hair used in the plaster was identical with hair found in the plaster of the wall.

To give an idea of the extensive use of photography, during the past year eighty scenes of fires were photographed, which included 434 views and 871 prints of the same. As to photomicrography, fifty-three pictures were taken and eighty prints made.

In addition, in the Bureau of Photography, there is a modern




**The Photostat Comes to the Fore**

Handwriting evidence, which resulted in a confession in a burning case. Note "K" in word Karl of second line. This was suspect's usual writing. It is exactly the same as the "K" in the third line, which is part of a threat note. Also "A" of second line from bottom, which was printed by suspect at the request of the detective, is the same as "A" in Karl of threat note.

photostat machine which is used to copy records and enlarge fingerprint photographs and also to make copies of circulars that may be sent out for the apprehension of a fugitive. The photostat machine is many times used to copy records of books which, if held by the department, may be an inconvenience to the owner. Copies are made to be used until such time as is necessary to produce the original in court. Many other uses are made of this photostat machine.

**Gas Detector**

The presence of explosive mixtures and inflammable fluids is detected by this method.

### Handwriting

The Department of Public Safety also has a handwriting expert who aids the Fire Marshal's Division and only recently a case, involving four threatening notes which were received prior to the setting of four fires, was solved when the handwriting expert made the discovery that the notes were written by the young woman who had received them and who had set the fires herself. She confessed when confronted with the fact that she had written the notes.

### Chemistry

Chemistry plays a very important part in arson investigation. The Massachusetts Department of Public Safety maintains a complete chemical laboratory which is equipped with all instruments that can be found in the modern laboratory. Liquids and materials suspected of being saturated with inflammables are submitted to the chemists and the reports received from the laboratory give the investigator a basis to work on. The determination of the particular inflammable fluid used, resulted in solving cases many times. In a recent case, a garment taken from a suspect was found to be saturated with gasoline and the chemical analysis proved that it was the same type of gasoline as found at the scene of the fire. Many other similar incidents might be enumerated.

### Crime of Arson

Due to the limitations of space, the chapter on the "Crime of Arson" series has been omitted from this issue. It will appear in the August issue.

## NEW FLOODLIGHTING TRUCK WITH ENCLOSED CAB TO PROTECT DRIVER

**Union City, N. J., Installs Apparatus Which Includes a Definite Step Forward, in That Shelter Is Provided for Driver and Operator Against Cold and Inclement Weather**

THE illustration shows an emergency floodlighting truck recently put in service by the Fire Department of Union City, N. J. The truck was designed and built under the supervision of Chief Charles F. Friedel, of the department. The body is fitted with a cab. The entire unit represents a definite step forward, in giving protection to the driver and operator of an emergency unit of this kind. Its appearance is attractive in the streamlined effect of the body and shrouded wheels.

The electrical installation is designed by John C. Clendenin, Electrical Engineer, New York City, and consists of a 2,000-watt, 110 volt d.c. generator, mounted in the chassis and driven directly from the power takeoff by a propeller shaft with universal joints. Automatic voltage control is obtained by regulator assembled under the cowl.

The lighting circuits are controlled by switches attached to the watertight outlets. There are four stanchions on the car, the two forward holding two 500-watt lamps and the two rear two 250-watt lamps. In addition there are two other small lamps of 200 watts each, which are stored in the car.

The present cable equipment consists of 100-foot lengths of cable, with watertight connectors, which are carried in compartments on the car. It is later proposed to apply a live circuit cable reel under the car in the rear.

The upholstering of the seats is in red leather which forms a contrast to the white paint with gold striping.

The Union City Fire Department has found the floodlighting equipment an invaluable addition to its apparatus. This new car supersedes a unit which has previously been in service for some years. The original unit was not equipped with automatic voltage control, with the result that a greater attention was required, when the car was in service. It has been found with the automatic voltage control feature, the unit may be put into service and operated without keeping an attendant constantly at the vehicle, to regulate the voltage as the load is applied or disconnected.

**Emergency Floodlighting Truck of Progressive Design Recently Put in Service by Union City, N. J., Department of Public Safety**

### Chief Charles S. Burns Dead

Charles A. Burns, Chief of Fire Department, Little Rock, Ark., died on June 10, in a doctor's office following a heart attack. He was fifty-eight years old.

He had spent thirty-eight years in the fire service, starting as lantern boy. His father was an officer in the old volunteer force.

He became a hoseman on August 1, 1898, and a year later was advanced to Captain. He was promoted to Assistant Chief on January 7, 1902. In 1923 he was sent to Chicago to attend the fire school. Burns was appointed Chief on February 14, 1933, when Chief Hafer resigned.

He is survived by his widow, a daughter, two sons, two brothers, and two sisters.

# What Was the Cause of the Morro Castle Disaster?

## Testimony at Trial of Officers Brought Out Some Interesting Facts About the Underlying Causes of This Tragedy

By JOHN KENLON*

A GREAT deal has been written about the Morro Castle disaster since that ship was destroyed by fire on September 8, 1934, off Asbury Park, N. J.

The blame for the disaster has variously and at different times been placed on the following:

The presence of inflammable metal polish said to be used on shipboard.

Labor troubles.

Inadequate water supply and pressure for fire fighting purposes.

Death of the Captain.

Incendiarism and lack of proper training on the part of the crew.

While some of these may have contributed to the spread of the fire, the real cause of the disaster was brought out in testimony offered by witnesses at the trial of the company and officers held early this year. This fundamental cause can be expressed in one word—construction.

But first let us review briefly the essential details of the disaster.

### Comparatively a New Ship

The Morro Castle was comparatively a new ship, launched in 1930. Her first trip from New York City to Havana was made on August 23, 1930. She was 508 feet long, beam 70 feet, with a displacement of 11,250 tons.

The Morro Castle was just completing her 174th trip to and from Havana and had on board 555 persons when the fire occurred. She was about six miles off Asbury Park, twenty miles south of Scotland Light Ship, and thirty miles from New York harbor when the fire was discovered. A fresh breeze of 30 miles an hour was blowing, a high sea running and it was raining hard at the time.

### Fire Spread with Great Rapidity

Testimony at the trial indicated that the fire started in a locker in the writing room on the port side of the ship between 2:55 and 3 a.m. on the morning of September 8, 1934. Smoke was seen seeping out around the door of this locker and, when the door was thrown open, contents were all ablaze. The door of the locker was immediately closed. In a minute or two fire had spread outside the locker, the ceiling in the writing room was ablaze in a corner, and the draperies on the windows in the immediate neighborhood were burning. In five minutes vast flames came from the ceiling and the sides of the writing room. The forward port corner of the lounge immediately abaft the writing room was all ablaze. There was a fire in the starboard side of the lobby forward of the library before there was any fire in the library. Within three minutes the forward lobby and the writing room were ablaze and clouds of very heavy smoke were given off. In about seven minutes' time the fire had extended at least half way through the lounge and was leaping up into the mezzanine on the deck above.

From this time things happened so quickly and the fire spread so fast that an accurate chronicle of events in sequence is impossible. Due to panic, fire and heavy smoke, life saving operations were difficult.

Ex-Chief John Kenlon

**Chief Kenlon recently served as expert witness at the trial of the Officers of the "Morro Castle," and with his many years experience in charge of the New York Fire Department's Marine Fleet and his twenty years as head of the New York Fire Department, he is particularly fitted to discuss this great steamship disaster with authority.**

### Attempt to Tow Vessel Failed

A number of persons jumped from the ship while she was still in motion. Others returned to their rooms for clothing, jewelry and money and were never seen again. Life boats were lowered, some filled with passengers and crew but a number only partly filled. The coast guard boat "Tampa" attempted to tow the Morro Castle toward New York but the hauser snapped and fouled the "Tampa's" propeller. It was necessary then for the "Tampa" to anchor.

The burning steamship was brought to anchor off Asbury Park. Shortly after this the "Tampa" removed Chief Officer Warms, a part of the crew and a few survivors among the passengers who had taken position on the forecastle head. This was about 2:30 in the afternoon.

### Equipment of "Morro Castle"

The U. S. Steamboat Inspection Service had listed the Morro Castle as having the following equipment:

Nine watertight bulkheads, electrically controlled watertight doors, steel deck houses, automatic electric fire detecting system, smoke reporting system, fire alarm signal stations throughout the ship, carbon-dioxide smothering system, no less than

*Formerly Chief of the New York Fire Department. Paper presented before the Convention of the Eastern Association of Fire Chiefs at Poughkeepsie, N. Y., July 10-11, 1936.

seventy-three two and one-half gallon extinguishers and forty-two fire hydrants with hose lines, and two emergency fire pumps. Thus it would seem that the ship was equipped with the best and most modern equipment to confront a disaster such as occurred.

### Construction Responsible for Spread of Fire

The construction of the ship, or rather defects in construction, were wholly responsible for the spread of the fire and the disaster which resulted. All steel work was concealed behind thin panels and ceilings of plywood, such plywood enclosing concealed channels of from three to twelve inches in depth. These channels were practically inter-connected over the entire area of each deck, so that fire once starting behind or above the plywood surfaces could travel quickly over the entire area, finding its source of fuel in the plywood.

The sketch herewith shows the location of the writing room, library, lobbies, and lounge on B deck, early involved in the fire.

The construction of the writing room was as follows: all surrounding bulkheads were constructed of steel; the floor of the writing room was of steel; the inboard side of the writing room constituted part of the boiler hatch enclosure which was made of steel; while the outboard side, that on the port side of the ship, was formed by the steel of the promenade deck house. The after end of the writing room consisted of a complete steel bulkhead except for a doorway, where there was a fire screen door, constructed of double sheet steel with insulation, which, when closed, made a steel bulkhead all the way across the after part of the writing room. At the forward end of the writing room, beginning from a point at the side of the steel deck house and extending within three or four feet of the boiler casing was a steel bulkhead and steel ventilator. Further along the forward side there was an opening between the ventilator and the boiler casing, which opening formed a doorway between the writing room and the forward lobby.

### Wood Finish and Space Beneath Allow Flames to Spread

Supporting the steel deck over the writing room were steel beams which crossed the deck athwarthship, extending down about six inches. These steel beams were covered by a joiner ceiling underneath. This joiner ceiling consisted of wood frames, fastened to furring pieces, bolted to the beams and in these wood frames were set joiner panels with moldings, forming the trim around the edge of the panels. The furring pieces were pieces of wood which extended downward from the beams one or two inches. The joiner ceiling was made of plywood, that is, wood made up of lumber core and cross banding with a thin veneer glued on each side of the core, and on top of that the face veneer consisting of a thin sheet of veneer glued to each side. The joiner ceiling was between 3/8 and 5/8-inch thick.

Due to the depth of the beam, the space between the ceiling and the deck above was 7 to 8 inches. Although the ceiling was fastened to furring strips, which in turn were fastened securely to the under flanges of the beams, there were openings in the furring strips either to provide for the passage of pipes or where the strips did not quite meet. The fire could communicate readily from one bay between beams to the next.

The finishing of the sides was practically the same. However, the depths of the beams on the sides were different. For example, the depth of the side beams on the port side of the roont were such that the concealed space was 12 inches deep, while the concealed space in the inboard side, that is, adjacent to the boiler hatch, was 2 to 3 inches deep.

### Same Defects in Lobby, Library and Lounge

The same type of construction was found in the lobby, but in this case the ceiling space was a little deeper, the finished ceiling hanging down a few inches lower.

The library was finished off in very much the same manner as the writing room.

Out in the lounge there was a mezzanine encircling the room, and the ceiling under the mezzanine was also hollow, permitting the fire to travel over the entire area.

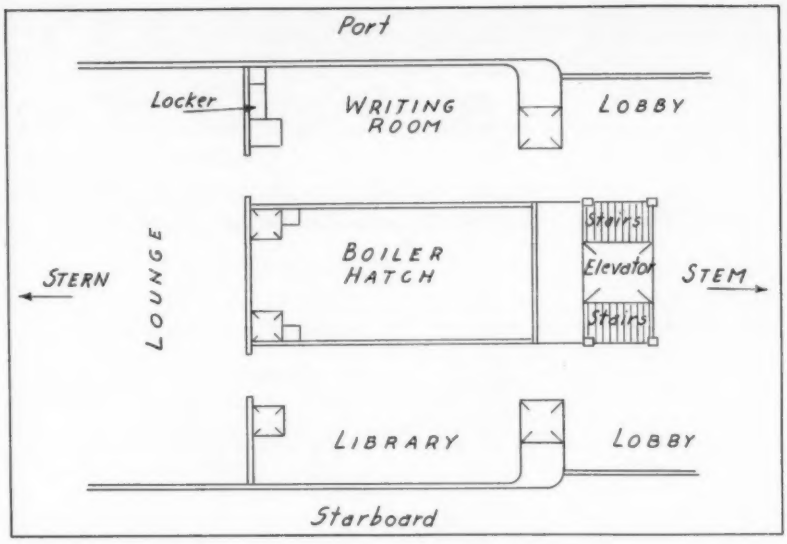
Off the lobbies were two passageways flanked on either side by state-

The Smoldering Wreck of the Morro Castle, Beached on the Sands at Asbury Park, N. J. The Ship Was Destroyed by Fire, Which Took Toll of 134 Lives, on the Night of Sept. 8, 1934.

rooms, and the joiner ceilings underneath the steel beams created hollow spaces which spread over the passageways and into the state rooms.

In the center part of the afterside of the forward lobby there was a main stairway with stairs running up to A deck and down to the lower deck, and running up and down through this stairwell was an elevator shaft which extended from A to B deck and through which the forward passenger elevator was operated.

The locker in which the fire started was located in the writing room as indicated in the sketch. It was backed by a steel bulkhead, but here too, the wood lining of the locker room was placed several inches away from the metal bulkhead, and the front side of the locker was made entirely of wood. The inboard side of the locker was within a few inches of a ventilator shaft, constructed of steel. The outboard side was finished entirely in wood with quite a large concealed space, permitting the travel of fire unobstructed into the blind space above the writing room ceiling.




Location of the Writing Room, Library, Lobbies and Lounge on "B" Deck of the "Morro Castle," Parts of the Vessel Early Involved in the Fire

### Course of Flames in Concealed Spaces

The fire started in this locker, and after entering the ceiling above the writing room, apparently spread both forward and aft, in the former direction entering the lobby and in the latter, the lounge.

The fact that fire was seen in the lobby off the library before it was found in the library indicates that it probably traveled from the writing room around to the writing room lobby and then across the ship and into the library lobby, finally entering the library.

Fire also passed through concealed ceiling spaces into the lounge and entered the space between the wood joiner ceiling and steel work beneath the mezzanine, quickly traveling out over this area. From the foregoing it is evident that the fire traveled very rapidly and involved a large part of C deck. The fact that the fire was burning in concealed spaces, where streams could not reach it, defeated all efforts made by the crew to bring it under control. As a matter of fact, testimony indicated that while men were playing hose streams at one point, fire would suddenly break out of the ceiling behind them, with the result that checking its spread was an impossibility with the equipment and facilities aboard the ship.

### Construction Very Severe Hazard

It is further evident that the type of construction employed constituted a very severe hazard. Once fire gained any hold at all above the false ceiling there was nothing to check its spread in all directions. The presence of steel bulkheads with no openings for the passage of fire would have checked the spread of the fire for a time and probably make it possible for the crew to extinguish it.

Although there were large openings in bulkheads in the form of doors, these doors were readily visible and constituted far less hazard to the spread of fire than the small, concealed openings. Fire did not pass from one section of the deck to another through doorways and past men at nozzles. It passed over their heads and without their immediate knowledge.

Thus the construction of the ship herself may be considered as the foremost hazard contributing to her ultimate destruction by fire.

### How to Prevent Such Disasters

As to preventing such a condition in ships built in the future, or to further prevent such disasters, channels through which fire may travel concealed should be completely cut off by approved fire stops. Eliminating concealed channels will retard the spread of fire and give the crew an even chance of extinguishing it. Today fireproof lumber bearing the label of the National Board of Fire Underwriters is being produced and serves in practically the same manner as any other lumber not so treated. With this lumber available there is still less excuse for future ships being built in such a way as to stimulate the spread of fire.

### Check the Spread of Fire

All fire fighters are familiar with the "taxpayer" type of construction with the open "cockloft" running over a whole row of buildings. We are also familiar with the "cockloft" over the old style frame houses built in rows up to 32 houses in one block. Fire getting into the "cockloft" spreads in both directions and unless the Fire Department gets lines in ahead of the spreading fire, there is likelihood of the entire row becoming involved.

It takes some fire-fighting experience to know how to head off such a fire.

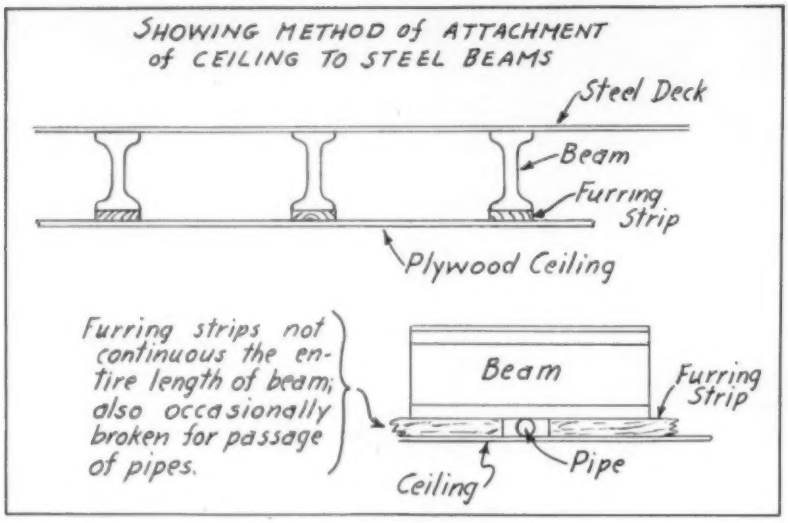
In the case of fire-fighting crews on ships, they can never be expected to perform with the same effectiveness as municipal Fire Department members.

Hence, they cannot be expected to anticipate where fire, spreading through concealed spaces, may have extended and have spaces opened up, if possible, to get lines in quickly to head it off.

The only solution of this problem is to build ships so that fire cannot spread through concealed passageways. Had this been done in the case of the "Morro Castle," the terrible fire that destroyed her and the sacrifice of 134 lives would not have occurred.

### Water Supply of Ships

Testimony offered at the trial indicated that fire streams, particularly




after a number of nozzles had been opened, were ineffective. It was reported that in some instances no water showed at the nozzle.

To check up on this particular feature of fire protection of the "Morro Castle," a survey was made of the water system of the "Oriente," a sister ship of the "Morro Castle," built from the same plans as the latter. The fire protection systems were identical, including pumps, supply mains, placement of hydrant valves and the number of hydrants provided. Tests were conducted at two different times, January 8 and 14, 1936. These tests were carried out under the direction of Chief Kenlon. Nozzle pressure gauging was done by Fred Shepperd and pump recordings were made by George L. Swann, Assistant Engineer of the National Board of Fire Underwriters. Tests conducted on different days were as follows:

### Tests and Their Results

On January 8, the fire streams were first calibrated on Deck A, then Deck B, Deck C, Deck D and Deck E, only those valves reported as having been opened during the fire on the "Morro Castle" being opened during the test.

On the second day, the tests were a little more comprehensive, each line was opened in sequence of the openings of lines on the "Morro Castle," as indicated by testimony. After each stream was gauged, a subsequent nozzle was opened and then both streams gauged; then a third nozzle, and all three streams gauged. This procedure was followed until all 14 nozzles were in operation.

In both of the tests the same results were secured, namely, that after six of the lines were in operation, the pressure at the nozzles fell considerably and as additional lines were put in operation, the pressures fell further until when all fourteen lines were in operation, those nozzles on the top deck (Deck A) showed no pressure whatsoever.

Despite the poor nozzle pressure, the fire pumps, which included one regulation fire pump and two sanitary pumps, continued to maintain 100 pounds and were never pushed to capacity.

In other words, the poor nozzle pressure was caused by friction loss in the pipe lines and fittings, rather than by drop in pressure at the pump.

These tests showed conclusively the defective hydraulic engineering applied in the design of the fire protection system. Four-inch risers and laterals were used throughout and short angle Ls and Ts were employed.

Apparently those designing the fire protection system on the ship followed precedent, that is, the design of fire protection systems on ships built previously. Apparently no hydraulic calculations were made to determine the size of risers and laterals necessary.

Under these conditions, the full capacity of the pumps was not available for use in furnishing fire streams, and hence the work of the crew in fire fighting was seriously handicapped, especially on the upper deck, where the streams were worthless after 8 or 10 were in operation at one time on different decks.

### Ability of Crew to Fight Fire

The question was brought up in the testimony as to the ability of the crew to fight the fire. On this point it should be made clear that the average deckhand has no experience at fighting fires and although he may be thoroughly drilled in the use of apparatus and equipment, when it comes to combatting a real fire, he is of no more value than any other layman.

Hence, the claim that improperly trained crew was responsible for the spread of the fire must be discounted.

### Conclusions from Investigation

The following conclusions from the foregoing must be drawn:

That in the construction of large ships, proper attention must be given to fire stopping passages through which fire may travel. There can be no long, open ducts to carry the fire from one part of the ship to another. The effectiveness of steel bulkheads is nullified when there are openings in the bulkheads through which fire may travel concealed.

Secondly, fire resistant construction must be given serious study in its application to ship building. It is not practicable to use metal or other heavy materials in the construction of state rooms, so that reliance will probably have to continue on wood work. However, woodwork can be fireproofed by methods today approved by Underwriters Laboratories, so that a solution of this problem is now available.

Third, better engineering is required in the layout of fire protection systems. While it is unreasonable to expect a pumping system capable of supplying satisfactory streams from all outlets on a boat at one time, still the system should be so laid out as to make available satisfactory streams from possibly half of the lines which might be stretched at one time. This would not, in most cases, require any additional pump capacity but would necessitate installation of larger risers and larger laterals.

Finally, the employment of one or two trained firemen to organize fire drills on board steamers would aid materially in producing effective work in the event of emergency.

The crew never had a chance to extinguish the fire. In fact, it would require the employment of a fourth alarm assignment to control and extinguish such a dangerous fire, if the ship was docked in New York Harbor.

### As to Lay Juries in Ship Trials

In closing, I would like to offer a question which might serve as food

(*Continued on page* 315)

# One-Half of Fire Apparatus Now in Use is Obsolete

## Survey Conducted by FIRE ENGINEERING Covering Nearly 600 Cities in the United States Shows Alarming Condition

ON June 13, a little town in Ohio awoke to find its principal industrial plant afire.

The Fire Department was called promptly, and responded with its two pumpers, and combination chemical and hose truck. Shortly after one of the pumpers was put in service, it broke down. The other pump was able to give but a limited supply. Despite help from neighboring towns, the plant was completely destroyed, with a loss of $120,000.

A Fire Department in a large eastern city has been having endless trouble with apparatus, much of which has reached the limit of its usefulness. The Chief reports that when apparatus is sent out in answer to an alarm he is "never certain that any of the machines will arrive at the fire." Nearly every pumper in the department goes to the repair shop at least once a year, and many are sent several times a year for major repairs.

Other Fire Departments throughout the country report growing difficulties in keeping apparatus in operating condition.

Such reports indicate but one thing: The generally depreciated condition of fire apparatus, due to failure to replace worn out units during the past few years.

To aggravate the situation, the development in commercial vehicles and private cars has continued during that period, until today fire apparatus on the highways is at a tremendous disadvantage both as to speed and braking facilities.

Even the lightest pleasure cars today have four-wheel brakes. Yet, but forty per cent of the fire trucks rolling on the streets, are similarly equipped. To be specific, in reports received from the 500 cities throughout the country, covering 4,831 pieces of fire apparatus, 2,876 still have two-wheel brakes. This represents 59½% so equipped.

From the standpoint of tires, too, fire trucks are still very much behind times. Out of 4,831 trucks included in the survey, 1,082 still have solid tires.

While in the compilation of figures shown in the tables accompanying this article, 801 out of 5,580 pieces of apparatus are reported as needing to be replaced, the percentage is actually higher, when braking equipment, pumping capacity, motor performance with present day fuels and other points are taken into consideration. It is quite a fair assertion to state that one-half of the present apparatus in service could be profitably replaced.

Though the survey on which the table herewith is based covers approximately 500 cities, lack of space makes it necessary to include only those cities above 10,000 population. However, the summary gives the figures on all the cities reporting, and the total population of which is 28,234,544. In the case of pumpers of 500 gallons or less, 425 were reported in service as of June 1, 1936. Of this number 236 were 10 or more years old. A total of 103 are considered as needing replacement at this time.

Of pumpers from 500 to 1,000 gallons per minute capacity, 1,911 are reported in service, of which 1,223 are 10 or more years old.

Pumpers in service of over 1,000 gallons capacity, total 167, of which 77 are ten or more years old. The number of pieces of other types of apparatus in service and the proportion over ten years old are tabulated.

The summary shows that 48½% of all apparatus in present use has passed a decade of service.

From the above it is evident that a very large proportion of equipment today is unsafe; that a very large percentage will require replacement in the near future.

To make the problem of obsolete apparatus still more aggravated, industry has been picking up in recent months, inventories are building up, and therefore values and fire hazards likewise.

Fire Departments, which were able to maintain satisfactory protection during depression will soon find themselves incapable of continuing their good fire records.

Depleted personnel in cities will be aggravated by apparatus of very uncertain dependability. There is, therefore, a rapidly growing need for better fire protection. Apparatus that served during the business lull, covering the past six years, will find itself called upon to perform much more difficult tasks in the future, and with several more years age on it.

If cities are to continue to enjoy low fire loss records, accomplished by fire departments during the past four or five years, it will be absolutely necessary to make replacement of obsolete machines. There can be no delay.

*(See following pages for tables)*

**Summary of Data on Motor Apparatus Covering 572 Cities and Representing a Population of 28,234,544**

| *Type of Vehicle* | Total No. in service 6/1/36 | Total 10 or more years old | Total in reserve | Number that should be replaced |
|---|---|---|---|---|
| Pumpers— 500 g.p.m. or less | 425 | 236 | 45 | 103 |
| 500-1000 " | 1,911 | 1,223 | 215 | 192 |
| over 1000 " | 167 | 77 | 8 | 14 |
| Chemical Cars | 108 | 60 | 17 | 10 |
| Combination Chemical & Hose | 597 | 392 | 64 | 156 |
| City Service Trucks | 491 | 284 | 62 | 73 |
| Aerial Trucks | 496 | 215 | 51 | 59 |
| Hose Cars | 348 | 120 | 27 | 50 |
| Salvage Cars | 31 | 11 | 1 | 8 |
| Chiefs Cars | 749 | 55 | 77 | 118 |
| Emergency Cars (Squad, Floodlighting, etc.) | 257 | 48 | 8 | 18 |
| Totals | 5,580 | 2,721 | 575 | 801 |
| Totals, Less Chiefs' Cars | 4,831 | 2,666 | 498 | 683 |

# Age and Condition of Motor Apparatus in Service in the United States

(A) Total App. of the types listed now in service. (B) In service over 10 years. (C) In reserve. (D) Number that should be replaced

| City and State | Population | Repair Shop | No. trucks with solid tires | No. trucks two wheel brakes | Pumpers 500 gpm or less | | | | Pumpers 501 1000 gpm | | | | Pumpers over 1000 gpm | | | | Chemical Cars | | | | Combination Chem. & Hose | | | | City Serv. Trucks | | | | Aerial Trucks | | | | Hose Cars | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D |
| New York, N. Y. | 6,500,000 | Yes | 485 | 349 | .. | .. | .. | .. | 269 | 166 | 28 | 19 | 1 | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | .. | .. | 20 | 20 | 12 | .. | 146 | 20 | 22 | 10 | 123 | 15 | .. | 13 |
| Detroit, Mich. | 1,565,000 | Yes | 9 | 11 | 2 | 2 | .. | .. | 58 | 38 | 8 | 15 | 2[9] | .. | .. | .. | .. | .. | .. | .. | 7 | 7 | .. | .. | 10 | 7 | 2 | 4 | 19 | 8 | 3 | 6 | 4 | 4 | 0 | 2 |
| Boston, Mass. | 795,256 | Yes | 10 | 86 | .. | .. | .. | .. | 52 | 35 | 12 | 0 | .. | .. | .. | .. | .. | .. | .. | .. | 21 | 9 | 8 | 0 | 9 | 8 | 4 | 0 | 23 | 9 | 6 | 0 | 27[1] | 3 | 0 | 0 |
| San Francisco, Cal. | 719,536 | Yes | 10 | 69 | .. | .. | .. | .. | 34 | 32 | 0 | 6 | 25 | 6 | 0 | 6 | 15 | 15 | 4 | 0 | .. | .. | .. | .. | 43[2] | 22[2] | 8[2] | 0 | 1 | 0 | 0 | 0 | 3 | 3 | 0 | 0 |
| Pittsburgh, Pa. | 700,000 | Yes | 9 | 50 | .. | .. | .. | .. | 49 | 26 | 1 | 0 | 1 | 0 | 0 | 0 | .. | .. | .. | .. | 13 | 11 | 0 | 0 | 13 | 8 | 0 | 0 | 9 | 8 | 1 | 0 | .. | .. | .. | .. |
| Buffalo, N. Y. | 599,000 | Yes | 16 | 16 | .. | .. | .. | .. | 38 | 38 | 3 | 0 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 0 | 0 | 0 | 13 | 7 | 2 | 0 | 3 | 2 | 0 | 0 |
| Washington, D.C. | 594,000 | Yes | 39 | 56 | .. | .. | .. | .. | 30 | 21 | 7 | 5 | .. | .. | .. | .. | .. | .. | .. | .. | 30 | 20 | 6 | 11 | 1 | 1 | 2 | 1 | 13 | 5 | 3 | 2 | .. | .. | .. | .. |
| Minneapolis, Minn. | 486,000 | Yes | 0 | 5 | .. | .. | .. | .. | 21 | 9 | 14 | 0 | .. | .. | .. | .. | 2[5] | 1[5] | 0 | 0 | .. | .. | .. | .. | 4 | 3 | 3 | 0 | 4 | 1 | 1 | 0 | 5[6] | 0 | 0 | 0 |
| Newark, N. J. | 444,170 | Yes | 38 | 44 | .. | .. | .. | .. | 32 | 24 | 4 | 1 | 2 | .. | .. | .. | .. | .. | .. | .. | 11 | 11 | 0 | 11 | 1 | 1 | 0 | 1 | 11 | 7 | 2 | 4 | .. | .. | .. | .. |
| Rochester, N. Y. | 328,000 | Yes | 19 | 36 | .. | .. | .. | .. | 20 | 19 | 0 | 0 | .. | .. | .. | .. | .. | .. | .. | .. | 5 | 5 | 2 | 5 | 5 | 5 | 1 | 0 | 5 | 4 | 0 | 0 | .. | .. | .. | .. |
| Toledo, Ohio | 309,000 | No | 2 | 3 | .. | .. | .. | .. | 10 | 6 | 0 | 3 | .. | .. | .. | .. | .. | .. | .. | .. | 6[11] | 0 | 5[11] | 0 | 8 | 2 | 0 | 3 | 2 | 2 | 0 | 1 | 5 | 0 | 0 | 0 |
| Louisville, Ky. | 307,000 | No | 1 | 0 | 2 | 0 | 0 | 0 | 20 | 13 | 1 | 4 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 5 | 5 | 0 | 0 | 3 | 3 | 0 | 0 | 1 | 0 | 0 | 0 |
| Columbus, Ohio | 297,000 | Yes | 11 | 36 | .. | .. | .. | .. | 30 | 17 | 1 | 0 | .. | .. | .. | .. | .. | .. | .. | .. | 9 | 6 | 2 | 6 | 5 | 0 | 1 | 0 | 4 | 3 | 0 | 0 | .. | .. | .. | .. |
| Birmingham, Ala. | 275,000 | Yes | 4 | 39 | .. | .. | .. | .. | 21 | 14 | 1 | 4 | 2 | 2 | 0 | 2 | .. | .. | .. | .. | 6 | 6 | 1 | 0 | 2 | 1 | 0 | 1 | 2 | 2 | 0 | 1 | .. | .. | .. | .. |
| Providence, R. I. | 259,133 | Yes | 9 | 79 | .. | .. | .. | .. | .. | .. | .. | .. | 29 | 24 | 5 | 0 | .. | .. | .. | .. | 1 | 1 | 1 | 0 | 9 | 9 | 0 | 3 | 6 | 5 | 0 | 0 | .. | .. | .. | .. |
| Richmond, Va. | 200,000 | Yes | 67 | 5 | 3 | 3 | 0 | 0 | 17 | 14 | 1 | 0 | 1 | 0 | 0 | 0 | 10 | 10 | 3 | 0 | 10 | 10 | 0 | 0 | .. | .. | .. | .. | 7 | 7 | 1 | 0 | 15 | 15 | 4 | 0 |
| Worcester, Mass. | 195,600 | Yes | 0 | 41 | .. | .. | .. | .. | 9 | 6 | 0 | 0 | 1 | 0 | 0 | 0 | .. | .. | .. | .. | 14 | 14 | 2 | 2 | 7 | 5 | 0 | 0 | 3 | 2 | 0 | 1 | 1 | 1 | 0 | 1 |
| Youngstown, Ohio | 185,000 | Yes | 1 | 3 | .. | .. | .. | .. | 9 | 11 | 2 | 0 | .. | .. | .. | .. | 1 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | .. | .. | .. | .. |
| Oklahoma City, Okla. | 182,845 | Yes | 1 | 18 | 4 | 0 | 0 | 0 | 9 | 11 | 2 | 0 | .. | .. | .. | .. | .. | .. | .. | .. | 5 | 5 | 0 | 0 | 2 | 2 | 1 | 0 | 3 | 1 | 0 | 0 | 0 | 1 | 1 | 0 |
| Miami, Fla. | 181,000 | Yes | .. | .. | .. | .. | .. | .. | 10 | 11 | 1 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 3 | 3 | 0 | 0 | 2 | 2 | 0 | 0 | .. | .. | .. | .. |
| Fort Worth, Texas | 170,000 | Yes | 1 | 35 | .. | .. | .. | .. | 16 | 15 | 1 | 0 | .. | .. | .. | .. | .. | .. | .. | .. | 3[12] | 3[12] | 0 | 0 | 6 | 6 | 0 | 0 | 1 | 1 | 0 | 0 | .. | .. | .. | .. |
| Grand Rapids, Mich. | 168,000 | Yes | 3 | 24 | .. | .. | .. | .. | 12 | 11 | .. | .. | .. | .. | .. | .. | 1 | 1 | 1 | 1 | .. | .. | 2 | .. | 4 | 3 | 1 | .. | 2 | 2 | .. | .. | .. | .. | 2 | .. |
| New Haven, Conn. | 162,655 | Yes | 2 | 53 | .. | .. | .. | .. | 16 | 11 | 0 | 0 | .. | .. | .. | .. | .. | .. | .. | .. | 13 | 8 | 0 | 0 | 2 | 2 | 0 | 0 | 4 | 3 | 0 | 0 | 13 | 3 | 0 | 0 |
| Long Beach, Cal. | 162,000 | Yes | 1 | 19 | .. | .. | .. | .. | 12 | 9 | 0 | 3 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 |
| Nashville, Tenn. | 160,000 | Yes | 0 | 12 | .. | .. | .. | .. | 17 | 10 | 0 | 0 | 1 | 1 | 0 | 0 | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | .. | .. | .. | .. |
| Flint, Mich. | 156,492 | Yes | 0 | 17 | .. | .. | .. | .. | 9 | 7 | 1 | 4 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | 5 | 3 | .. | 1 | 2 | 2 | .. | 1 | .. | .. | .. | .. |
| Yonkers, N. Y. | 151,000 | Yes | 17 | 19 | 0 | 0 | 0 | 0 | 8 | 4 | 1 | 4 | .. | .. | .. | .. | .. | .. | .. | .. | 4 | 0 | 0 | 4 | 1 | 1 | 1 | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bridgeport, Conn. | 147,000 | Yes | 3 | 5 | 0 | 0 | 0 | 0 | 12 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 5 | 5 | 0 | 1 | 2 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 1 | 1 | 0 | 1 |
| Jacksonville, Fla. | 146,259 | Yes | 1 | 19 | .. | .. | .. | .. | [13] | 7 | 1 | [3] | 2 | 0 | 0 | 0 | .. | .. | .. | .. | 1 | 0 | 0 | 0 | 3 | 2 | 1 | 2 | 2 | 1 | 1[15] | 1 | .. | .. | .. | .. |
| Des Moines, Iowa | 142,539 | Yes | 0 | 25 | 4 | 4 | 0 | 0 | 6 | 5 | 1 | 0 | .. | .. | .. | .. | .. | .. | .. | .. | 7 | 7 | 0 | 0 | 4 | 3 | 1 | 0 | 1 | 1 | 0 | 0 | .. | .. | .. | .. |
| Tulsa, Okla. | 142,000 | Yes | 17 | .. | .. | .. | .. | .. | 11 | 5 | 2 | 0 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | 1 | 0 | 2 | 1 | 1 | 0 | 1 | .. | .. | .. |
| Baltimore, Md. | 140,000 | Yes | 0 | 11 | 3 | 4 | 1 | 0 | 8 | 6 | 1 | 0 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Norfolk, Va. | 130,000 | Yes | 6 | 7 | .. | .. | .. | .. | 3 | 3 | 1 | .. | 13 | 11 | 0 | 0 | .. | .. | .. | .. | 3 | 3 | 3 | 0 | .. | .. | .. | .. | 7 | 7 | 0 | 0 | 6 | 3 | 1 | 0 |
| Spokane, Wash. | 128,000 | Yes | 1 | 9 | 4 | 4 | 0 | 4 | 5 | 2 | 0 | 0 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | 1 | 1 | 4 | 3 | 1 | 2 | 1 | 0 | 0 | 0 | 2 | 2 | 2 | 2 |
| Trenton, N. J. | 123,356 | Yes | 2 | 4 | .. | .. | .. | .. | 10 | 5 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 10 | 5 | 2 | 0 | 1 | 1 | 0 | 1 | 3 | 2 | 0 | 0 | .. | .. | .. | .. |
| Kansas City, Kan. | 122,000 | Yes | 0 | 7 | .. | .. | .. | .. | 11 | 5 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | 0 | 0 | 3 | 3 | 0 | 1 | 1 | 1 | 0 | 0 | .. | .. | .. | .. |
| Peoria, Ill. | 120,000 | No | .. | .. | 1 | 0 | 0 | 0 | 14 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | .. | .. | .. | .. | 3 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 3 | 0 | 0 | 1 | 5 | 0 | 0 | 0 |
| Camden, N. J. | 119,000 | Yes | 5 | 13 | 0 | 0 | 0 | 0 | 10 | 8 | 1 | 0 | .. | .. | .. | .. | .. | .. | .. | .. | 6 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | .. | .. | .. | .. |
| Cambridge, Mass. | 118,646 | Yes | 11 | 11 | 0 | 0 | 0 | 0 | 11 | 7 | 2 | 4 | .. | .. | .. | .. | .. | .. | .. | .. | 9 | 8 | 1 | 4 | 0 | 0 | 1 | 0 | 4 | 3 | 0 | 2 | .. | .. | .. | .. |
| Fall River, Mass. | 115,000 | Yes | 1 | 17 | 0 | 0 | 0 | 0 | 9 | 8 | 0 | 0 | .. | .. | .. | .. | .. | .. | .. | .. | 4 | 4 | 1 | 0 | 1 | 1 | 0 | 1 | 4 | 3 | 0 | 2 | 1 | 1 | 1 | 0 |
| Knoxville, Tenn. | 111,800 | Yes | 2 | 13 | .. | .. | .. | .. | 11 | 9 | 1 | 6 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | .. | .. | .. | .. |
| Wilmington, Del. | 110,000 | Yes | 13 | 11 | .. | .. | .. | .. | 7 | 6 | 1 | 0 | 3 | 3 | 0 | 0 | .. | .. | .. | .. | 10 | 3 | 2 | 0 | 1 | 1 | 0 | 0 | 2 | 1 | 0 | 0 | .. | .. | .. | .. |
| Evansville, Ind. | 107,000 | Yes | .. | 4 | .. | .. | .. | .. | 11 | 6 | 0 | 0 | .. | .. | .. | .. | .. | .. | .. | .. | 2[13] | 2[13] | 0 | 0 | 3 | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 |
| Tacoma, Wash. | 106,000 | No | 0 | 14 | .. | .. | .. | .. | 12 | 8 | 0 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 1 | 3 | 2 | 1 | 1 | 0 | 0 | 2 | 2 | 0 | 2 | .. | .. | .. | .. |
| So. Bend, Ind. | 105,000 | Yes | 0 | 6 | 10 | 5 | 0 | 5 | 1 | 0 | 0 | 0 | .. | .. | .. | .. | 2 | 0 | 0 | 0 | .. | .. | .. | .. | 2 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | .. | .. | .. | .. |
| Summerville, Mass. | 104,000 | Yes | 0 | .. | 1 | 2 | 1 | 0 | 6 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 2 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 6 | 0 | 1 | 0 |
| Utica, N. Y. | 103,000 | Yes | 0 | 15 | .. | .. | .. | .. | 8 | 5 | 0 | 5 | 1 | 0 | 0 | 0 | .. | .. | .. | .. | 2 | 2 | 2 | 2 | 3 | 3 | 1 | 3 | 2 | 0 | 0 | 0 | .. | .. | .. | .. |
| El Paso, Texas | 103,000 | Yes | 0 | 3 | .. | .. | .. | .. | 9 | 5 | 1 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | .. | .. | .. | .. |
| Duluth, Minn. | 101,463 | Yes | 0 | 14 | 1 | 1 | 1 | 0 | 6 | 5 | 1 | 1 | 5 | 4 | 0 | 1 | .. | .. | .. | .. | 1 | 1 | 0 | 1 | 2 | 2 | 0 | 0 | 2 | 1 | 0 | 0 | .. | .. | .. | .. |
| Lowell, Mass. | 100,000 | Yes | 0 | 19 | 9 | 9 | 0 | 0 | 2 | 1 | 1[13] | 0 | .. | .. | .. | .. | 1 | 1 | 0 | 0 | 3 | 3 | 1 | 0 | 3 | 3 | 0 | 0 | 2 | 2 | 1 | 1 | .. | .. | .. | .. |
| Waterbury, Conn. | 99,902 | Yes | 10 | 20 | 10 | 9 | 3 | 0 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 4 | 4 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Schenectady, N. Y. | 98,000 | Yes | 2 | 12 | 2 | 2 | 0 | 2 | 9 | 5 | 0 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | 0 | 1 | 2 | 1 | 0 | 1 | .. | .. | .. | .. |
| Wilkesbarre, Pa. | 90,000 | Yes | 9 | 16 | 1 | 0 | 0 | 0 | 7 | 6 | 0 | 0 | .. | .. | .. | .. | .. | .. | .. | .. | 6 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | .. | .. | .. | .. |
| Charlotte, N. C. | 90,000 | Yes | 0 | .. | 1 | 1 | 1 | 1 | 5 | 3 | 0 | 0 | 3 | 1 | 0 | 0 | .. | .. | .. | .. | .. | .. | .. | .. | 3 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | .. | .. | .. | .. |
| Lawrence, Mass. | 86,785 | No | 1[8] | 11 | .. | .. | .. | .. | 6 | 6 | 0 | 3 | 1 | 0 | 0 | 0 | .. | .. | .. | .. | 1 | 1 | 0 | 1 | 3 | 3 | 0 | 1 | 1 | 1 | 0 | 0 | .. | .. | .. | .. |
| Saginaw, Mich. | 85,000 | Yes | 0 | 9 | 1 | 1 | 0 | 0 | 6 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | .. | .. | .. | .. | 1 | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | .. | .. | .. | .. |
| Sioux City, Iowa | 85,000 | Yes | 1 | 9 | .. | .. | .. | .. | 1 | 6 | 0 | 0 | 5 | 4 | 1 | 0 | .. | .. | .. | .. | 4 | 3 | 1 | 0 | 2 | 2 | 0 | 0 | 1 | 1 | 0 | 0 | .. | .. | .. | .. |
| Little Rock, Ark. | 81,679 | Yes | 1 | 1 | 0 | 0 | 1 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | .. | .. | .. | .. |
| St. Joseph, Mo. | 80,936 | Yes | 2 | 18 | 1 | 1 | 0 | 0 | 9 | 9 | 0 | 0 | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | 1 | 3 | 2 | 2 | 1 | 0 | 1 | 1 | 0 | 0 | 1[21] | 0 | 0 | 0 |
| Huntington, W. Va. | 80,000 | Yes | 1 | 6 | .. | .. | .. | .. | 7 | 6 | 0 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | .. | .. | .. | .. |
| Lincoln, Neb. | 80,000 | Yes | 4 | 14 | 3 | 3 | 0 | 3 | 5 | 4 | 0 | 0 | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | .. | .. | .. | .. |
| Pasadena, Calif. | 80,000 | Yes | 0 | 9 | 5 | 1 | .. | .. | 10 | 4 | 1 | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. |
| Quincy, Mass. | 79,000 | No | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 2 | 1 | 0 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 0 | 0 | 0 | 5 | 2 | 0 | 0 | .. | .. | .. | .. | .. | .. | .. | .. |
| Manchester, N. H. | 77,000 | Yes | 5 | 18 | .. | .. | .. | .. | 8 | 8 | .. | .. | 2 | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | 1 | .. | 4 | 4 | .. | .. | 2 | 2 | .. | .. | 2 | 2 | .. | .. |
| Roanoke, Va. | 75,000 | Yes | 0 | 10 | 1 | 0 | 1 | 0 | 9 | 4 | 0 | 0 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | 0 | 0 | .. | .. | .. | .. |
| Charleston, W. Va. | 75,000 | Yes | 0 | 12 | 1 | 1 | 0 | 1 | 3 | 3 | 0 | 3 | .. | .. | .. | .. | .. | .. | .. | .. | 3 | 2 | 0 | 2 | 1 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | .. | .. | .. | .. |
| Springfield, Ill. | 72,000 | Yes | 0 | 14 | 4 | 4 | 0 | 4 | 4 | 2 | 0 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | 1 | 2 | 1 | 1 | 0 | 0 | .. | .. | .. | .. |

| City and State | Population | Repair Shop | No. trucks with solid tires | No. trucks two wheel brakes | Pumpers 500 gpm or less | | | | Pumpers 500-1000 gpm | | | | Pumpers over 1000 gpm | | | | Chemical Cars | | | | Combination Chem. & Hose | | | | City Serv. Trucks | | | | Aerial Trucks | | | | Hose Cars | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D |
| Dearborn, Mich. | 72,000 | Yes | 0 | 6 | .. | .. | .. | .. | 2 | 1 | 0 | 6 | 2 | .. | .. | .. | 1 | .. | .. | .. | 1 | .. | .. | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| New Britain, Conn. | 71,000 | Yes | 1 | 9 | 2 | 2 | 0 | 2 | 4 | 4 | 0 | 0 | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | 1 | 2 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | .. | .. | .. | .. |
| Lakewood, Ohio | 70,717 | Yes | 1 | 6 | .. | .. | .. | .. | 4 | 4 | 0 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | .. | .. | .. | .. |
| Topeka, Kan. | 70,000 | Yes | 1 | 6 | 1 | 0 | 0 | 6 | 5 | 5 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | .. | .. | .. | .. |
| Montgomery, Ala. | 70,000 | Yes | 1 | 16 | 1 | 1 | 0 | 0 | 7 | 6 | 1 | 0 | .. | .. | .. | .. | 1 | 1 | 0 | 0 | 2 | 2 | 2 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | .. | .. | .. | .. |
| Cicero, Ill. | 70,000 | Yes | 0 | 6 | 1 | 1 | 1 | 0 | 5 | .. | .. | .. | .. | .. | .. | .. | 5 | .. | .. | .. | 5[13] | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. |
| Springfield, Ohio | 68/70,000 | No | 1 | 14 | .. | .. | .. | .. | 2 | 2 | .. | 2 | 2 | .. | .. | .. | .. | .. | .. | .. | 4 | .. | .. | .. | 2 | 1 | .. | 1 | 1 | 1 | .. | 1 | .. | .. | .. | .. |
| Village Oak Park, Ill. | 68,000 | Yes | 3 | 5 | .. | .. | .. | .. | 4 | 3 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | 1 | 1 | .. | .. | 1 | 1 | 1 | 1 |
| Racine, Wisc. | 67,542 | No | 0 | 6 | 1 | 1 | .. | 1 | 5 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 1 | .. | .. | 1 | 1 | .. | .. | 1 | 1 | 1 | .. |
| Irvington, N. J. | 66,000 | Yes | 6 | 8 | .. | .. | .. | .. | 5 | 3 | 1 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | 1 | 1 | .. | .. | 1 | 1 | .. | 1 |
| Pontiac, Mich. | 65,000 | Yes | 0 | 8 | .. | .. | .. | .. | 4 | 4 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 2 | 2 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. |
| Hammond, Ind. | 65,000 | Yes | 0 | 4 | 1 | 1 | 1 | .. | 6 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. |
| Mt. Vernon, N. Y. | 65,000 | Yes | .. | 16 | .. | .. | .. | .. | 5 | 5 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | 1 | 1 | .. | .. | 2 | 2 | .. | .. | .. | .. | .. | .. |
| Glendale, Cal. | 65,000 | Yes | 0 | 8 | .. | .. | .. | .. | 7 | 6 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Brockton, Mass. | 63,000 | Yes | 0 | 19 | .. | .. | .. | .. | 5 | 4 | 1 | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | 1 | .. | 2 | .. | .. | .. | 6 | 5 | .. | .. |
| Terre Haute, Ind. | 62,810 | Yes | 1 | 9 | .. | .. | .. | .. | 8 | 5 | .. | 3 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | 1 | .. | 4 | 3 | .. | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. |
| Wheeling, W. Va. | 62,000 | Yes | 9 | 9 | 2 | 2 | .. | 2 | 6 | 4 | .. | 4 | 2 | 2 | .. | .. | .. | .. | .. | .. | 1 | 1 | 1 | .. | 1 | 1 | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. |
| Medford, Mass. | 61,135 | Yes | 0 | 2 | .. | .. | .. | .. | 6 | 4 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1[13] | .. | .. | .. | 1 | 1 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. |
| Union City, N. J. | 60,000 | Yes | 4 | 7 | .. | .. | .. | .. | 6 | 4 | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | 3 | 2 | 1 | 1 | .. | .. | .. | .. |
| Malden, Mass. | 58,000 | Yes | 0 | .. | .. | .. | .. | .. | 2 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 6[13] | 2 | 1 | .. | 2 | 2 | .. | .. | 1 | .. | .. | .. | 2 | 2 | .. | 2 |
| Beaumont, Texas | 58,000 | Yes | 1 | 17 | .. | .. | .. | .. | 6 | 6 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | 4 | 4 | .. | 4 | 1 | 1 | .. | .. | 1 | 1 | .. | .. | 1 | 1 | .. | 1 |
| Madison, Wis. | 57,899 | Yes | 1 | 4 | .. | .. | .. | .. | 6 | 3 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 3 | 2 | .. | .. | 1 | .. | .. | .. |
| Phoenix, Ariz. | 57,000 | Yes | 1 | 7 | 1 | 1 | 1 | 1 | 4 | 1 | .. | .. | 3 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. |
| Holyoke, Mass. | 56,000 | Yes | .. | 16 | .. | .. | .. | .. | 6 | 5 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | 1 | 1 | 1 | 1 | .. | .. | 2 | 1 | 1 | 1 | .. | .. | .. | .. |
| Jackson, Mich. | 55,000 | Yes | .. | 8 | .. | .. | .. | .. | 6 | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. |
| Fresno, Cal. | 55,000 | Yes | 3 | 12 | 5 | .. | 1 | 2 | 9 | 8 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | 1 | 1 | .. | .. | 1 | .. | .. | .. |
| Macon, Ga. | 55,000 | Yes | .. | 8 | .. | .. | .. | .. | 7 | 5 | 1 | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 2 | .. | .. | .. | 2 | 1 | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. |
| Pueblo, Colo. | 50,000 | Yes | 1 | 5 | 1 | 3 | 1 | 3 | 3 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 1 | .. | .. | .. | 2 | 3 | .. | .. |
| Everett, Mass. | 50,000 | Yes | 1 | 6 | .. | .. | .. | .. | 5 | 2 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 1 | .. | 1 | 1 | .. | .. | .. | 1 | 1 | .. | 1 |
| Clifton, N. J. | 50,000 | Yes | 0 | 5 | 2 | 1 | .. | .. | 3 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | 1 | 1 | .. | .. |
| Elmira, N. Y. | 50,000 | Yes | 1 | 6 | .. | .. | .. | .. | 5[28] | 3 | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | 1[29] | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. |
| Pittsfield, Mass. | 49,000 | Yes | 1 | 6 | 1 | .. | .. | .. | 2 | 1 | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | 1[13] | 1 | .. | .. | 1 | 1 | .. | .. | 1 | 1 | .. | 1 | 1 | 1 | .. | .. |
| Haverhill, Mass. | 48,561 | Yes | 0 | 0 | 2 | 2 | 1 | 2 | 4 | 4 | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | 2 | 2 | .. | 1 | 1 | 1 | .. | 1 | 1 | 1 | .. | .. | .. | .. | .. | .. |
| Aurora, N. Y. | 48,000 | No | 0 | 3 | .. | .. | .. | .. | 4 | 1 | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | .. | .. | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. |
| Bay City, Mich. | 48,000 | Yes | 0 | .. | .. | .. | .. | .. | 4 | 3 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 4 | 3 | .. | 2 | 2 | 2 | .. | 1 | .. | .. | .. | .. | 1 | 1 | .. | 1 |
| Upper Derby Township, Pa. | 46,626 | No | 1 | 4 | 1 | .. | .. | .. | 4 | 2 | .. | 1 | .. | .. | .. | .. | 1 | .. | .. | .. | 2 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. |
| Stamford, Conn. | 46,318 | Yes | 1 | 2 | .. | .. | .. | .. | 2 | 2 | .. | 1 | 1 | .. | .. | .. | 1 | 1 | .. | 1 | 1 | 1 | .. | 1 | 2 | 1 | 1 | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. |
| Lexington, Ky. | 46,000 | Yes | 0 | 13 | .. | .. | .. | .. | 7 | 7 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | 1 | .. | .. | .. | 2 | 2 | .. | .. |
| Montclair, N. J. | 46,000 | Yes | 0 | 7 | .. | .. | .. | .. | 3 | 2 | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 3 | 1 | .. | 1 | 2 | 1 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. |
| Portsmouth, Va. | 45,000 | Yes | 5 | 6 | .. | .. | .. | .. | 4 | 4 | 1 | 3 | 3 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. |
| Salem, Mass. | 43,335 | Yes | 0 | 6 | 1 | 1 | .. | .. | 4 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | 1 | 1 | 1 | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. |
| St. Petersburg, Fla. | 43,000 | Yes | 1 | 10 | .. | .. | .. | .. | 5 | 5 | 1 | 2 | 1 | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | 1 | 2 | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. |
| Poughkeepsie, N. Y. | 43,000 | Yes | 2 | 7 | .. | .. | .. | .. | 5 | 2 | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | .. | 1 | .. | .. | .. | .. | 2 | 2 | .. | 1 | .. | .. | .. | .. |
| Joliet, Ill. | 42,993 | Yes | 1 | 6 | 1 | .. | .. | .. | 3 | 3 | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | 1 | 1 | .. | .. | 6 | 4 | .. | .. |
| Portsmouth, Ohio | 42,500 | Yes | 1 | .. | 1 | 1 | .. | .. | 4 | 3 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 1[34] | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. |
| Dubuque, Iowa | 41,728 | No | 0 | 5 | 2 | 2 | .. | 2 | 3 | 3 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. |
| Fitchburg, Mass. | 41,700 | Yes | 6 | 3 | 1 | 1 | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 5 | 5 | .. | 2 | 2 | 2 | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. |
| Meriden, Conn. | 40,800 | Yes | 2 | 2 | .. | .. | .. | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | 1 | 2 | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. |
| High Point, N. C. | 40,400 | Yes | 1 | 6 | 1 | .. | .. | .. | 4 | 3 | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. |
| Santa Monica, Calif. | 40,000 | Yes | 1 | 8 | 1 | 1 | .. | .. | 4 | 2 | 1 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Bloomfield, N. J. | 40,000 | No | 0 | 5 | .. | .. | .. | .. | 4 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | 1 | .. | 1 | 1 | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. |
| Quincy, Ill. | 40,000 | Yes | 6 | 12 | 1 | 1 | .. | .. | 4 | 4 | .. | .. | 2 | 1 | 1 | 1 | 3 | 3 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. |
| Danville, Ill. | 40,000 | No | 1 | 4 | .. | .. | .. | .. | 2 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | 3 | 2 | .. | 2 |
| E. Cleveland, Ohio | 40,000 | Yes | 0 | 3 | .. | .. | .. | .. | 2 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Norwalk, Conn. | 40,000 | Yes | 2 | 11 | 1 | 1 | .. | .. | 3 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | 2 | .. | 2 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Fargo, N. D. | 38,000 | Yes | 0 | 4 | 1 | 1 | .. | .. | 2 | 1 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | 1 | 1 | 1 | .. | .. | .. | .. | .. |
| Cumberland, Md. | 37,737 | Yes | 1 | 5 | 1 | 1 | .. | .. | 3 | 3 | 1 | 2 | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. |
| Elgin, Ill. | 37,000 | No | 1 | 3 | 1 | .. | .. | .. | 4 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. |
| Auburn, N. Y. | 36,652 | Yes | 5 | 5 | 1 | 1 | .. | .. | 2 | 2 | .. | .. | 2 | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | 1 | .. | 1 | 1 | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. |
| Revere, Mass. | 36,000 | Yes | 0 | 5 | .. | .. | .. | .. | 6 | 3 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | 2 | .. | .. | .. | .. | .. | 1 | .. |
| Superior, Wis. | 36,000 | Yes | 0 | 5 | .. | .. | .. | .. | 4 | 3 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | 1 | .. | .. | .. | .. | .. | 1 | 1 | 1 | 1 | .. | .. | .. | .. |
| Norwood, Ohio | 36,000 | No | 1 | 6 | .. | .. | .. | .. | 2 | 2 | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | 1 | .. | 1 | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. |
| New London, Conn. | 35,000 | Yes | 1 | 8 | .. | .. | .. | .. | 5 | 5 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | 1 | .. | 1 | 1 | .. | 1 | 1 | 1 | .. | .. | .. | .. | .. | .. |
| Amsterdam, N. Y. | 35,000 | No | 1 | 4 | 1 | .. | .. | .. | 2 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 1 | 1 | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. |
| Lewiston, Me. | 35,000 | No | 0 | 4 | 2 | 1 | .. | .. | 2 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | 1 | .. | .. | .. | 1 | .. | .. | .. |
| Newark, Ohio | 35,000 | No | 2 | 4 | 2 | .. | .. | 1 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | .. | 2 | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. |
| Bakersfield, Calif. | 35,000 | Yes | 1 | 1 | 2 | .. | .. | .. | 5[36] | 2 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. |

## Age and Condition of Motor Apparatus in Service in the United States (Continued)

(A) Total App. of the types listed now in service. (B) In service over 10 years. (C) In reserve. (D) Number that should be replaced.

| City and State | Population | Repair Shop | No. trucks with solid tires | No. trucks two wheel brakes | Pumpers 500 gpm or less | | | | Pumpers 500-1000 gpm | | | | Pumpers over 1000 gpm | | | | Chemical Cars | | | | Combination Chem. & Hose | | | | City Serv. Trucks | | | | Aerial Trucks | | | | Hose Cars | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D |
| Colorado Springs, Colo. | 35,000 | Yes | 0 | 7 | 1 | 1 | .. | .. | 1 | 1 | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | 4 | 4 | 2 | 3 | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. |
| Newport News, Va. | 34,000 | Yes | 5 | 5 | 1[25] | .. | .. | .. | 5 | 4 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 1 | .. | 1 | 1[37] | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Laredo, Texas | 34,000 | Yes | 0 | 8 | .. | .. | .. | .. | 2 | 2 | .. | 1 | .. | .. | .. | .. | 1 | .. | .. | .. | 2 | .. | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Rome, N. Y. | 33,000 | Yes | 0 | 4 | .. | .. | .. | .. | 3 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | .. | .. | 1[39] | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| E. Providence, R. I. | 33,000 | Yes | 0 | 4 | .. | .. | .. | .. | 1 | 1 | .. | .. | 2 | .. | .. | .. | .. | .. | .. | .. | 5 | 2 | .. | 1 | 1 | 1 | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. |
| Alexandria, Va. | 33,000 | Yes | 1 | 1 | 2 | .. | 2 | .. | 2 | 1 | .. | .. | 3 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | 2 | .. | 1 | 1 | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. |
| Elkhart, Ind. | 32,949 | Yes | 0 | 5 | .. | .. | .. | .. | 4 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. |
| Newport, Kentucky | 32,844 | Yes | 1 | 3 | .. | .. | .. | .. | 3 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | 1 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. |
| Muskogee, Okla. | 32,000 | Yes | 0 | 10 | 1 | 1 | .. | .. | 5 | 4 | 1 | 3 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 1 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. |
| Newburg, N. Y. | 31,275 | Yes | 1 | 6 | 2 | 2 | .. | 2 | 3 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | .. | .. | .. | .. |
| Alton, Ill. | 31,000 | No | 0 | 0 | .. | .. | .. | .. | 4 | 4 | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | .. | 1 | .. | .. | .. | 1 | 1 | 1 | .. | .. | .. | .. | .. | .. |
| Bellingham, Wash. | 31,000 | Yes | 0 | 4 | .. | .. | .. | .. | 3 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Wilkinsburg, Pa. | 30,000 | No | 1 | 6 | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | 1[41] | .. | .. | .. | 1 | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | 1 | 1 | 1 | .. |
| Middletown, Ohio | 30,000 | No | 0 | 2 | .. | .. | .. | .. | 3 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 2 | .. | .. | .. |
| N. Tonowanda, N. Y. | 30,000 | Yes | 2 | 4 | .. | .. | .. | .. | 5 | 4 | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 3[48] | .. | .. | .. |
| Mishawaka, Ind. | 29,000 | Yes | .. | 7 | .. | .. | .. | .. | 3 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | 1 | 1 | 2 | 1 | .. | 1 | .. | .. | .. | .. | 1 | .. | 1 | .. |
| Wyandotte, Mich. | 28,369 | Yes | .. | 3 | .. | .. | .. | .. | 3 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Linden, N. J. | 28,000 | Yes | 3 | 2 | .. | .. | .. | .. | 3 | 2 | 1 | 1 | .. | .. | .. | .. | 1 | .. | .. | .. | 2 | 2 | .. | .. | 1[44] | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Eau Claire, Wis. | 28,000 | Yes | .. | 6 | .. | 1 | 1 | .. | 1 | 1 | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. |
| Massillon, Ohio | 28,000 | Yes | .. | 2 | 2 | .. | .. | 2 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. | 2 | .. | .. | .. |
| Newport, R. I. | 27,612 | Yes | .. | 10 | .. | .. | .. | .. | 5 | 3 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | .. | .. | 1 | 1 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. |
| Ann Arbor, Mich. | 27,500 | Yes | 4 | .. | .. | .. | .. | .. | 3 | 5 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. |
| Salem, Oregon | 27,008 | No. | .. | .. | .. | .. | .. | .. | 2 | 1 | .. | .. | 3 | 1 | .. | .. | .. | .. | .. | .. | 2 | 1 | .. | 2 | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. |
| Michigan City, Ind. | 27,000 | Yes | .. | 4 | .. | .. | .. | .. | 3 | 3 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. |
| Appleton, Wis. | 26,750 | ..... | .. | 6 | .. | .. | .. | .. | 2 | 2 | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. |
| Lebanon, Pa. | 26,500 | No | 2 | 9 | 2 | 2 | .. | 1 | 4 | 1 | .. | .. | 1 | .. | .. | .. | 1 | 1 | .. | .. | 2 | 2 | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| San Angelo, Texas | 26,000 | Yes | 1 | 4 | 2 | .. | 1 | 1 | 3 | 2 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. |
| Middletown, Conn. | 26,000 | No | 1 | 2 | 1 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. |
| Oil City, Pa. | 25,000 | No | 0 | 5 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | 1 | 2 | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. |
| Johnson City, Tenn. | 25,080 | Yes | .. | 3 | .. | .. | .. | .. | 3 | 2 | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. |
| Jackson, Tenn. | 25,000 | Yes | .. | 3 | .. | .. | .. | .. | 3 | 3 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1[46] | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Belmont, Mass. | 25,000 | Yes | .. | 3 | .. | .. | .. | .. | 2 | 2 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Granite City, Ill. | 25,000 | Yes | .. | 3 | .. | .. | .. | .. | 2 | 3 | .. | .. | .. | .. | .. | .. | 3[18] | .. | .. | .. | 1 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Beverly Hills, Calif. | 25,000 | Yes | .. | 4 | .. | .. | .. | .. | 3 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Northampton, Mass. | 25,000 | Yes | 1 | 9 | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 5 | 5 | .. | 5 | 1 | 1 | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. |
| Richmond, Calif. | 25,000 | Yes | 3 | 4 | .. | .. | .. | .. | 3 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1[50] | 3 | 2 | 3 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Yakim, Washington | 25,000 | Yes | .. | 4 | .. | .. | .. | .. | 4 | 2 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 1 | .. | 1 | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. |
| Marion, Ind. | 25,000 | Yes | .. | 8 | .. | .. | .. | .. | 5 | 5 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. |
| Lubbock, Texas | 25,000 | Yes | .. | 3 | 1 | 1 | .. | .. | 3 | 2 | .. | .. | .. | .. | .. | .. | 2 | .. | .. | .. | 1 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Pomona, Calif. | 24,000 | Yes | 1 | 5 | .. | 1 | 1 | .. | 3 | 2 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Hannibal, Mo. | 23,400 | Yes | .. | 3 | 1 | 1 | .. | .. | 2 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Mason City, Iowa | 23,304 | No | 1 | 3 | .. | 1 | 1 | 1 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | 1 | 1 | 1 | .. | .. | .. | .. |
| Manitowoc, Wis. | 23,000 | Yes | .. | 2 | .. | .. | .. | .. | 3 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Winona, Minn. | 23,000 | Yes | 1 | .. | 1 | .. | .. | .. | 4 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | .. | .. | .. | .. | 1 | 1 | 1 |
| Butler, Pa. | 23,000 | No | 1 | 6 | 1 | 1 | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 3 | 3 | 2 | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Tuscaloosa, Ala. | 22,683 | Yes | .. | 4 | .. | .. | .. | .. | 4 | 4 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Ft. Dodge, Iowa | 22,500 | Yes | 2 | 3 | 1 | .. | .. | .. | 3 | 2 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| No. Adams, Mass. | 22,085 | Yes | 1 | 5 | 1 | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. |
| Reno, Nev. | 22,000 | Yes | 1 | 5 | .. | .. | .. | .. | 4 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | 1 | 1 | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. |
| Peabody, Mass. | 22,000 | Yes | .. | 10 | 2 | .. | .. | .. | 3 | 3 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1[13] | 1 | .. | 1 | 1 | 1 | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. |
| Champaign, Ill. | 22,000 | Yes | 1 | 6 | .. | .. | .. | .. | 3 | 2 | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 |
| Methuen, Mass. | 21,500 | No | .. | 8 | 1 | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | .. | .. | 1 | 1 | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. |
| Garden, Mass. | 21,000 | No | 2 | 5 | .. | .. | .. | .. | 2 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | .. | 2 | 2 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Long Branch, N. J. | 21,000 | No | 1 | 10 | 1 | 1 | .. | .. | 3 | 3 | .. | .. | 1 | .. | .. | .. | 1 | 1 | .. | .. | 4 | 3 | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. |
| Pine Bluff, Ark. | 20,760 | Yes | .. | 4 | .. | .. | .. | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | 3 | 1 | .. | .. |
| Bessemer, Ala. | 20,721 | Yes | .. | 3 | .. | .. | .. | .. | 3 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Hamden, Conn. | 20,500 | No | .. | 5 | 3 | .. | .. | .. | 3 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Leavenworth, Kan. | 20,000 | Yes | .. | 3 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 3 | 3 | 1 | 3 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Stratford, Conn. | 20,000 | Yes | .. | 2 | 1 | 1 | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | 1[13] | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Gastonia, N. C. | 20,000 | Yes | .. | 3 | .. | .. | .. | .. | 3 | 3 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Uniontown, Pa. | 20,000 | Yes | 1 | 3 | .. | .. | .. | .. | 3 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. |
| Billings, Mont. | 20,000 | No | .. | 3 | 1 | 1 | .. | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | 1 | . | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Marshalltown, Iowa | 20,000 | No | .. | 3 | 3 | .. | 1 | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. |

| City and State | Population | Repair Shop | No. trucks with solid tires | No. trucks two wheel brakes | Pumpers 500 gpm or less | | | | Pumpers 500 1000 gpm | | | | Pumpers over 1000 gpm | | | | Chemical Cars | | | | Combination Chem. & Hose | | | | City Serv. Trucks | | | | Aerial Trucks | | | | Hose Cars | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D |
| Blue Island, Ill. | 20,000 | Yes | 1 | 3 | .. | .. | .. | .. | 1 | 1 | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. |
| Lancaster, Ohio | 20,000 | No | 1 | 2 | .. | .. | .. | .. | 1 | 2 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Johnson City, N. Y. | 19,000 | Yes | .. | 9 | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 3 | 3 | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Westfield, Mass. | 18,788 | No | .. | 2 | 3 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. |
| Auburn, Maine | 18,579 | No | .. | 5 | .. | .. | .. | .. | 4 | 2 | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | 1 | 1 | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | 1[88] | .. |
| Logansport, Ind. | 18,508 | Yes | 1 | 5 | 2 | .. | .. | .. | 2 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | 1 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Milton, Mass. | 18,289 | No | 1 | 2 | .. | .. | .. | .. | 2 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 3 | 1 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Burlingame, Calif. | 18,000 | No | .. | 1 | .. | .. | .. | .. | 2 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Decatur, Ala. | 18,000 | Yes | .. | 2 | .. | 3 | 1 | 1 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | 2 | .. | .. | .. | .. |
| Longview, Tex. | 18,000 | No | .. | 2 | .. | .. | .. | .. | 4 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. |
| Vallejo, Calif. | 18,000 | No | 2 | 3 | 1 | .. | .. | .. | 2 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | 1[84] | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. |
| Augusta, Maine | 18,000 | Yes | .. | 4 | 1 | 1 | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | 2 | 1 | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Meadville, Pa. | 18,000 | No | .. | 1 | 3 | .. | .. | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| San Mateo, Cal. | 18,000 | No | 1 | .. | 1 | .. | .. | .. | 2 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Biddeford, Maine | 18,000 | No | .. | 4 | .. | .. | .. | .. | 2 | 1 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | 1[55] | .. | .. | 1 | .. | .. | .. | .. | 1 | 1 | .. | .. | 1 | 1 | .. | 1 | .. |
| Englewood, N. J. | 17,805 | No | 3 | 1 | .. | .. | .. | .. | 1 | 1 | .. | .. | 2 | 1 | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | 2 | .. | 1 | .. | .. |
| Hillside, N. J. | 17,601 | No | .. | 2 | 1 | 1 | .. | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | 1 | .. | 1 | .. | .. |
| Ogdensburg, N. Y. | 17,500 | No | .. | 3 | .. | .. | .. | .. | 1 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. |
| Rutland, Vt. | 17,500 | No | .. | 4 | .. | .. | .. | .. | 3 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. |
| Grand Forks, N. D. | 17,295 | Yes | .. | 4 | 1 | 1 | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | 1 | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| W. Springfield, Mass. | 17,128 | No | .. | 1 | 1 | .. | .. | 1 | 2 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| New Castle, Ind. | 17,000 | No | .. | 1 | 1 | 1 | 1 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Dunkirk, N. Y. | 17,000 | yes | .. | .. | .. | .. | .. | .. | 3 | 3 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Palo Alto, Calif. | 16,500 | No | .. | 3 | .. | .. | .. | .. | 2 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Frederick City, Md. | 16,500 | No | 1 | 4 | 1 | .. | .. | .. | 1 | 1 | .. | .. | 3 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. |
| Decatur, Ga. | 16,300 | No | 1 | .. | 1 | 1 | .. | 1 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Wallingford, Conn. | 16,000 | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | .. | .. | .. | 1 | .. | .. | .. | 1[87] | .. | .. | .. | .. | .. | .. | .. | .. |
| Corning, N. Y. | 16,000 | Yes | .. | 5 | .. | .. | .. | .. | 2 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Ecorse, Mich. | 16,000 | Yes | 1 | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Iowa City, Iowa | 16,000 | Yes | .. | 1 | .. | .. | .. | .. | 2 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Morristown, N. J. | 16,000 | No | 1 | 7 | .. | .. | .. | .. | 2 | 2 | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. |
| Whittier, Calif. | 16,000 | No | .. | 3 | 2 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Greenfield, Mass. | 15,800 | No | .. | 3 | 1 | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Waterville, Maine | 15,645 | No | .. | 5 | .. | .. | .. | .. | 1 | .. | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | .. | 2 | 1 | 1 | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | .. |
| Muskegon Heights, Mich. | 15,500 | Yes | .. | 3 | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 1 | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. |
| Marquette, Mich. | 15,500 | No | .. | .. | .. | .. | .. | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Hastings, Nebr. | 15,490 | No | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | 1[84] | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Virginia, Minn. | 15,000 | No | .. | 4 | 1 | 1 | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Warren, Pa. | 15,000 | Yes | .. | 3 | 1 | .. | .. | .. | 2 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | 1 | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Redlands, Calif. | 15,000 | Yes | .. | 3 | 2 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | 4 | 3 | 2 | 2 | .. |
| Modesto, Calif. | 15,000 | No | 2 | 1 | 1 | .. | .. | .. | 3 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 1 | .. | .. | .. | .. |
| Parsons, Kans. | 15,000 | Yes | .. | 3 | 1 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | 2 | 2 | .. | .. | .. | .. | 1 | 1 | 1 | 1 | .. | .. | .. | .. | .. |
| Independence, Mo. | 15,000 | No | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Valdosta, Ga. | 15,000 | Yes | .. | 4 | .. | .. | .. | .. | 2 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Grand Junction, Colo. | 15,000 | Yes | 1 | 2 | 1 | 1 | .. | 1 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Stevens Pt., Wis. | 15,000 | No | .. | 3 | 1 | 1 | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | 1 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Marietta, Ohio | 15,000 | No | 1 | 2 | 1 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. | .. |
| Highland Park, Ill. | 15,000 | Yes | .. | 2 | .. | .. | .. | .. | 2 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Coatesville, Pa. | 15,000 | No | 3 | 6 | 1[12] | 1 | 1 | .. | 3 | 2 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. |
| Sumter, S. Car. | 15,000 | No | 1 | 2 | 2 | 1 | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Canonsburg, Pa. | 15,000 | No | .. | 2 | 1 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Greenville, Miss. | 14,876 | No | 2 | 2 | .. | .. | .. | .. | 2 | .. | .. | .. | .. | .. | .. | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Corsicana, Tex. | 14,500 | Yes | 1 | 2 | .. | .. | .. | .. | 3 | 2 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 3[13] | 2 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | 1[48] | .. | .. | .. | .. |
| Sault Sainte Marie, Mich. | 14,500 | No | .. | 1 | 1 | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Nyack, N. Y. | 14,000 | No | 1 | 6 | 1 | .. | .. | .. | 2 | 2 | .. | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 1 | .. | .. | .. | 1 | .. | .. | .. | .. |
| Winchester, Va. | 14,000 | No | .. | 4 | 1 | .. | .. | .. | 3 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Moberly, Mo. | 14,000 | No | .. | 1 | 1 | 1 | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Mt. Clements, Mich. | 14,000 | No | .. | 3 | .. | .. | .. | .. | 2 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Plattsburgh, N. Y. | 14,000 | Yes | 1 | 2 | 1 | 1 | .. | 1 | 2 | 1 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Traverse City, Mich. | 14,000 | No | 1 | 4 | 1 | 1 | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | .. | .. | .. | 1 | .. | .. | .. | .. | .. |
| Arkansas City, Kans. | 14,000 | Yes | .. | 1 | .. | .. | .. | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2[11] | 2[21] | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| So. Portland, Maine | 14,000 | Yes | .. | 4 | 1 | 1 | .. | 1 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 4[23] | 1 | .. | 1 | 2 | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | .. |
| Keene, N. H. | 13,774 | No | .. | 4 | .. | .. | .. | .. | 3 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Marinette, Wis. | 13,740 | Yes | .. | 3 | .. | .. | .. | .. | 2 | 2 | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Ontario, Calif. | 13,700 | Yes | .. | 3 | 1 | 1 | .. | 1 | 2 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Lewistown, Pa. | 13,500 | No | .. | 3 | 1 | .. | .. | .. | 2 | 1 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. | 2 | .. | .. | .. | .. |
| Ridgewood, N. J. | 13,500 | Yes | .. | 2 | .. | .. | .. | .. | 2 | 1 | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | 1 | .. | .. | .. | .. |
| Corbin, Ky. | 13,500 | No | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 1 | 1 | 2 | .. |
| Greeley, Ohio | 13,200 | Yes | .. | 2 | .. | 1 | 1 | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Cleburne, Tex. | 13,000 | Yes | 2 | 3 | .. | .. | .. | .. | 3 | 1 | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | .. |
| Oneonta, N. Y. | 13,000 | No | .. | 3 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Peru, Ind. | 12,730 | Yes | .. | 4 | 2 | 1 | .. | 1 | 1 | 1 | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Massena, N. Y. | 12,500 | No | .. | 1 | .. | .. | .. | .. | 2 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |

## Age and Condition of Motor Apparatus in Service in the United States (Continued)

(A) Total App. of the types listed now in service. (B) In service over 10 years. (C) In reserve. (D) Number that should be replaced.

| City and State | Population | Repair Shop | No. trucks with solid tires | No. trucks two wheel brakes | Pumpers 500 gpm or less | | | | Pumpers 500 1000 gpm | | | | Pumpers over 1000 gpm | | | | Chemical Cars | | | | Combination Chem. & Hose | | | | City Serv. Trucks | | | | Aerial Trucks | | | | Hose Cars | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D |
| Willimantic, Conn. | 12,500 | Yes | 1 | 5 | .. | .. | .. | .. | 2 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 1 | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. |
| St. Augustine, Fla. | 12,500 | No | 1 | 3 | 1 | 1 | .. | 1 | 2 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Bellevue, Pa. | 12,000 | No | .. | 3 | .. | .. | .. | .. | 2 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | [54] | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Logan, Utah | 12,000 | Yes | .. | 2 | 1 | .. | .. | .. | 2 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Huran, S. Dak. | 12,000 | Yes | .. | 1 | 1 | .. | .. | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Medford, Ore. | 12,000 | Yes | .. | 2 | .. | .. | .. | .. | 1 | .. | .. | .. | 1 | 1 | .. | .. | 1 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Idaho Falls, Idaho | 12,000 | No | .. | 2 | .. | .. | .. | .. | 2 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | [25] | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Greenwood, Miss. | 12,000 | No | .. | 3 | .. | .. | .. | .. | 2 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Lawton, Okla. | 12,000 | Yes | .. | 2 | .. | .. | .. | .. | 2 | 1 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 1 | 1 | .. | 1 |
| Barre, Vt. | 12,000 | .... | .. | 3 | 2 | 2 | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Ft. Collins, Colo. | 12,000 | Yes | .. | 2 | .. | .. | .. | .. | 2 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Trinidad, Colo. | 12,000 | No | .. | 3 | 2 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 1 | 1 | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. |
| Ventura, Calif. | 12,000 | Yes | .. | 2 | 1 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Helena, Montana | 12,000 | Yes | .. | 4 | 1 | .. | .. | .. | 1 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | 1 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. |
| Hopkinsville, Ky. | 12,000 | No | 2 | 4 | 1 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Fullerton, Calif. | 11,860 | No | .. | 2 | 2 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. |
| Seminole, Okla. | 11,559 | Yes | .. | 2 | 1 | 1 | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Ames, Iowa | 11,500 | No | 1 | 2 | 1 | 1 | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. |
| East Hampton, Mass. | 11,500 | No | .. | 1 | 3 | 1 | .. | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Hopewell, Va. | 11,000 | Yes | .. | 2 | 1 | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Brainerd, Minn. | 11,000 | No | 1 | 2 | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | [58] | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. |
| Sanford, Fla. | 11,000 | Yes | 1 | 3 | .. | .. | .. | .. | 2 | 3 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | 1 | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. |
| Latrobe, Pa. | 11,000 | Yes | 6 | 1 | 1 | 3 | 4 | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 3 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Stoneham, Mass. | 11,000 | No | 2 | 2 | .. | .. | .. | .. | 2 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Hickory, N. C. | 10,776 | Yes | 0 | 5 | 1 | 1 | .. | 3 | 2 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Shelbyville, Ind. | 10,743 | Yes | 0 | 1 | 1 | 1 | 2 | 1 | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 3 | .. | .. | .. |
| Manhattan, Kan. | 10,500 | No | 0 | 1 | .. | .. | .. | .. | 2 | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Sarasota, Fla. | 10,500 | Yes | 1 | 3 | 2 | 1 | .. | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | [33] | .. | .. | 1 | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. |
| Swampscott, Mass. | 10,400 | No | 0 | 0 | .. | .. | .. | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | [33] | .. | .. | .. | [33] | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Middlesboro, Ky. | 10,340 | No | .. | .. | 1 | 1 | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Herkimer, N. Y. | 10,300 | .... | 0 | 4 | 1 | 1 | .. | .. | 2 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Oskaloosa, Iowa | 10,125 | No | 0 | 1 | .. | .. | .. | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. |
| Brookfield, Ill. | 10,035 | Yes | 0 | 1 | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. |
| Coeur d'Alene, Idaho | 10,000 | No | 0 | 1 | 1 | .. | .. | .. | 2 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Murphysboro, Ill. | 10,000 | No | 0 | 4 | 1 | 3 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Suffolk, Va | 10,000 | Yes | 2 | 3 | .. | .. | .. | .. | 3 | 2 | 1 | .. | 1 | 1 | .. | .. | 1 | 1 | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. |
| El Dorado, Kan. | 10,000 | Yes | 0 | 3 | .. | .. | .. | .. | 2 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Chanute, Kan. | 10,000 | No | 0 | 2 | 1 | .. | .. | .. | 2 | 1 | 1 | .. | .. | .. | .. | .. | 1 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 3 | .. | .. | .. |
| Kirkwood, Mo. | 10,000 | No | 0 | 1 | .. | .. | .. | .. | 2 | 1 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Reading, Mass. | 10,000 | No | 0 | 2 | 1 | .. | .. | .. | 1 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| El Centro, Calif. | 10,000 | No | 2 | 2 | 1 | 1 | .. | 1 | 3 | 2 | 2 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Marblehead, Mass. | 10,000 | No | 0 | 4 | 1 | 1 | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Redondo Beach, Calif. | 10,000 | No | 0 | 2 | .. | .. | .. | .. | 1 | 1 | .. | 2 | .. | .. | .. | .. | 1 | 1 | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Brawley, Calif. | 10,000 | Yes | 1 | 3 | 1 | 1 | .. | 1 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Red Wing, Minn. | 10,000 | Yes | 0 | 4 | 1 | 1 | .. | 2 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Pulaski, Va. | 10,000 | Yes | 1 | 1 | 1 | 1 | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Terrell, Tex. | 10,000 | No | 0 | 3 | .. | .. | .. | .. | 2 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | 3 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Marion, Ill. | 10,000 | No | 0 | 1 | 2 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Derby, Conn. | 10,000 | No | 0 | 2 | 1 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. |
| Dalton, Ga. | 10,000 | No | 1 | 2 | 1 | 1 | 1 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Lansdale, Pa. | 10,000 | Yes | 0 | 3 | 1 | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Centralia, Wash. | 10,000 | Yes | 1 | 3 | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | 1 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |

[1]Hose cars with booster pumps, 24; [2]City service trucks with tractors, (A) 23, (B) 14, (C) 4; [3]Water tower; [4]Foam (A) 1; [5]With booster; [6]Hose car with turret, 4; [7]Water tower; [8]Smoke extractor; [9]Gasoline truck; [10]Delivery truck for supplies; [11]Combination booster and hose; [12]500 g.p.m. tractorized steam pump; [13]Combination and booster; [14]Combination and chemical, booster; [15]Obsolete; [16]Rescue, 1; [17]Ambulance 1; 2-35 gal. chemical tanks mounted on it, with turret pipe; other has a 100 gal. booster tank with 250 g.p.m. pump mounted on it; [18]Water tower, 1; [19]Steamer; [21]Hose car with deck gun and booster; [22]Salvage car, first aid, rescue and lights; [23]Booster and hose, 3; [24]Foam truck, 1; [25]Combination pumper, hose and ladders; [26]Forest fire truck; [27]Shop cars, 5; [28]Quadruple combination, 750 gal. pump, 1; [29]Combination ladder; [30]Salvage car, ladder and hose; [31]Chiefs' cars acting as emergency cars; [32]1 mechanics, 1 fire alarm car; [33]Fire alarm truck; [34]Hydrant truck; [35]Included with 36; [37]Included with 38; [39]Horse drawn; [40]Ambulance; [41]Chemical car with 200 gal. tank; [42]Floodlight carried on chemical car; [43]2 triple combination; 1 quadruple; [44]Salvage united with city service and pumper; [45]Used for alarm and repair work; [46]Carries 1,000 gal. pump; [47]Floodlights, combination; [48]Booster tank; [49]Hose car, rescue and salvage; [50]Combination with water tank; [51]Quadruple, also has 750 g.p.m. pump; [52]Hand drawn hook and ladder; [53]Trailer; [54]Quadruple combination; [55]With booster pump; [56]1,200 gal. water tank; [57]Hand ladder truck; [58]500 gal. water tank; [59]Boats; [60]Also 1 steel tire.

# DISPLAY OF NEW AND OLD APPARATUS STAGED BY NEW YORK FIRE DEPARTMENT

### Visiting Chiefs Guests at Graduation of Spring Class at Training School—$500,000 of New Apparatus Exhibited

WHILE Fire Department officials and officers from many cities looked on, New York City staged a display of ancient and modern fire apparatus in the plaza of City Hall on June 16. The show was arranged under the supervision of Assistant Chief George L. McKenna, with the assistance of Acting Battalion Chief Herman Kuch, in charge of the Division of Apparatus and Shops.

On display was "Old Skiver," a hand pumper of New York City dating back to 1812. This same engine was a feature of the "Midnight Alarm," which was staged at the Madison Square Garden.

Also on display were thirty-two new pieces of fire apparatus, representing an expenditure of about half a million dollars. There were twenty 1,000-gallon Mack pumpers and twelve Four Wheel Drive Company ladder trucks. The trucks are 85-foot aerials.

The ceremonies were opened by Fire Commissioner McElligott, who thanked Mayor LaGuardia for his splendid support. He described the pumpers and said that if attached to the standpipes of the Empire State Building, they could pump water to the top of the structure at a rate of 250 gallons a minute.

The Mayor told of the progress that has been made in the Fire Department, and of the six men from the ranks who are now taking college courses in engineering. He said:

"Young men are getting a technical training because fire fighting has become a technical science. No department in the city has a history such as the Fire Department. We have the best personnel in fire fighting of anywhere in the world."

Following the ceremonies at the plaza, a luncheon was served to the visiting Chiefs at the Hotel Montclair. It was tendered by the Mack Company and the Four Wheel Drive Company. After the luncheon the party went to the drill yard of the fire school to witness the graduation of the Spring Class of 1936.

Chief David J. Oliver, Chief Instructor, presented the class to the Commissioner and said:

"Three months ago you sent these fifty men to me. They have satisfactorily met the requirements. I now turn them back to you and I am sure that they are ready and able to carry on."

To prove that he was right, the rookies went through all kinds of evolutions and stunts including net jumping, sealing, and rescue work.

Some of the visting chiefs included John Gibson, Mt. Vernon; M. J. Fleming, Albany; Edward G. Shoemaker, Lancaster, Pa.; John Himmerman, Lebanon, Pa.; G. A. Smith, Pottsville, Pa.; C. A. Delaney, Lakewood, Ohio; Isaac M. Hubbard, Greenwich, Conn.; Thomas Coyle, Paterson, N. J.; John F. O'Neill, Weehawken, N. J.; James G. Hogan, Bayonne, N. J.; Ross B. Davis, Philadelphia, Pa.; W. S. Taggart, Asbury Park, N. J.; Michael Leonard, Erie, Pa.; Edward Geiselman, Syracuse, N. Y.; Lawrence E. Reif, New Haven, Conn.; John J. Brennan, Pelham Manor; Chris Noll, Poughkeepsie; William J. Lutz, Wilmington, Del.; August Derra, Schenectady; Howard Travers, Baltimore, Md.; James E. Granger, Cleveland, Ohio; Patrick J. Hurley, Holyoke, Mass.; John Towey, Newark, N. J.; Selden B. Allen, Brookline, Mass.; Thomas Murray, Teaneck, N. J.

There were also present a large number of city officials and others interested in the welfare of the department and the interesting display shown by its members in the graduation exercises.

**New York City Stages an Outdoor Fire Show**

Firemen performed from the top of aerial ladders for the benefit of the thousands who gathered at City Hall, to witness the display of fire apparatus.

## Regional School Held at St. Joseph

A successful regional fire school was held at St. Joseph Mo. The school was opened by J. Burr Taylor, Chairman, Secretary, Missouri State Fire Prevention Association. Chief Leo J. Urbanski, St. Joseph, welcomed the visitors. The following talks were given:

"Tannic Acid Treatment for Burns," Harold G. Ingham, Director of Extension, University of Kansas.

"Fire School 'Brevities,'" Richard E. Vernor, Manager, Fire Prevention Department, Western Actuarial Bureau, Chicago.

"Driving Fire Apparatus," Clarence Goldsmith, Assistant Chief Engineer, National Board of Fire Underwriters, Chicago.

"Salvage Developments," Chief William H. Gardner, Kansas City Fire Patrol.

District Chief Thomas J. Hardwick, Kansas City, led a discussion on department problems.

William H. Higgins, First Assistant Chief, St. Joseph, assisted by Capt. H. C. Ousley, Missouri Inspection Bureau, St. Louis, had charge of Fire Department evolutions.

Salvage evolutions were in charge of Chief T. M. Walden, Columbia, and Capt. H. C. Ousley.

## Chief Richard Lee Smith Retires

On July 1, Chief Richard Lee Smith, who has been connected with the Pittsburgh, Pa., Fire Department for 35 years, tendered his resignation to Safety Director Thomas A. Dunn, of that city. The interference on the part of Mayor with the administration of the Fire Department is reported to have been the underlying cause of Chief Smith's leaving the department.

During his incumbency as head of the Department, Chief Smith brought the per capita fire loss down to the lowest figure of any city of equal size in the nation.

Since the inauguration of Mayor McNair, the department has never been entirely free from political interference. On March 1 of 1934, the mayor dismissed Chief Smith without preliminary notice. As a result of pressure brought by various civic leaders, Chief Smith was re-instated early in 1935.

Chief Smith came from a fire-fighting family, being born, in 1878, the son of Fire Captain Leonard Smith. Young Richard was named after Richard Lee, the Union general, under whom his father had served in the Civil War.

Once Chief Smith entered the fire service, his rise was steady and rapid. He achieved the distinction of placing first in every Civil Service examination he ever took. After two months as a sub-hoseman he became a regular fireman, and in 1902 was appointed a driver of horse drawn apparatus. By 1907 Chief Smith was a lieutenant and in 1913 he was made a captain. Five years later he was District Chief for the downtown area and in 1926 he attained promotion to the post of Chief.

**Chicago has awarded bravery** certificates to Division Marshal John J. Costello, Battalion Chief John Falvey and Capt. William T. Moloney. The honor list also included eight Lieutenants and thirty-five firemen.

# New England Chiefs Hold Second Largest Convention

## Many Outstanding Papers and One of the Biggest Exhibits Signalize the Hartford Convention of the Association

By HARRY BELKNAP

WITH the second largest attendance in its history and a program of outstanding interest, the New England Association of Fire Chiefs held the 14th annual convention in Hartford, Conn., on June 23, 24 and 25.

Chief Carl D. Stockwell, of Burlington, Vt., was elected President for the ensuing year. The other officers chosen were as follows: First Vice-President, Chief Joseph W. Randlette, Richmond, Me.; Second Vice-President, Chief Thomas F. Burns, Bridgeport, Conn.; Secretary-Treasurer, Chief John W. O'Hearn, Watertown, Mass.; and Sergeant-at-Arms, Chief William T. Happny, Concord, N. H.

The following were elected State Vice-Presidents: Maine, Chief Oliver T. Sanborn, Portland; New Hampshire, Chief Charles H. French, Manchester; Vermont, Chief Alfred H. Koltonski, Rutland; Massachusetts, Chief William C. Mahoney, Peabody; Rhode Island, Chief Augustin J. Cote, Woonsocket; Connecticut, Chief Michael H. Lawton, Middletown. Under an amendment to the constitution adopted at the convention the State Vice-Presidents, with the officers, will hereafter constitute the Board of Directors of the association.

The display of motor fire apparatus and fire department appliances in the mammoth state armory building was one of the largest and most complete ever shown at a meeting of New England Chiefs. Chief Daniel B. Tierney, of Arlington, Mass., was Chairman of the Exhibit Committee.

### Ovation to Chief Moran

A pleasing feature of the convention was the ovation given to Chief John C. Moran, of the Hartford Fire Department, when he was presented with a handsomely embossed half century certificate at the banquet tendered to the Chiefs by the Hartford Fire Department.

Registration opened on Monday, June 22, at headquarters in the Hotel Bond, with George W. Austin and Charles J. Curtaz, of the Box 52 Association, Inc., of Boston, giving out the badges and room assignments.

By mid-afternoon many Chiefs were on hand, and the arrivals continued, until by early evening the "night before" crowd had been swelled to goodly proportions and informal reunions and greetings were taking place on all sides.

Exhibitors were busy in the armory getting their displays in shape and it was soon evident that the untiring efforts of Chief Tierney had resulted in a large and representative collection of exhibits. An unusual feature that attracted universal attention was the old hand engine and relics and pictures of volunteer days shown in the center of the hall by the Veteran Volunteer Firemen's Association of Hartford.

### Opening Session in Hotel Ballroom

The opening session of the convention was held Tuesday morning in the ball room on the top floor of the Hotel Bond. Chief David H. DeCourcy, of Winchester, Mass., presided, and the invocation was by the Rev. Raymond Cunningham, Chaplain of the Hartford Fire Department.

Some of the Chiefs, Associate Members, City Officials and Guests Assembled for the Fourteenth Annual Convention of the New

Seated on the platform with the officers were nine past presidents of the association. These were:

Chief John C. Moran, Hartford; Chief Oliver T. Sanborn, Portland, Me.; Chief Lawrence E. Reif, New Haven, Conn.; Chief Joseph S. Lawton, Newport, R. I.; Chief Alfred H. Koltonski, Rutland, Vt.; Chief Selden R. Allen, Brookline, Mass.; Chief Patrick J. Hurley, Holyoke, Mass.; Chief John S. Pachl, Annex Fire Department, New Haven, Conn.; and Chief Daniel B. Tierney, Arlington, Mass.

Following the invocation an address of welcome was delivered by John Mackey, Acting Mayor of Hartford. He extended the freedom of the city and brought greetings from Mayor Thomas J. Spellacy, who was attending the Democratic Convention in Philadelphia. Mr. Mackey said that Hartford is proud of Chief Moran and his department and are deeply grateful for the splendid

services rendered during the recent flood.

The second speaker was Fire Commissioner John McNally, of Hartford, and he was followed by Chief Moran, who received a resounding chorus of applause as he stepped forward to address the gathering.

The response to the addresses of welcome was made by Chief Joseph W. Randlette, of Richmond, Me.

President DeCourcy announced the appointment of Chief Randlette, Chief A. J. Cote, of Woonsocket, R. I., and Chief Arthur W. Spring, of Laconia, N. H., as the Committee on Courtesies.

### Memorial Services

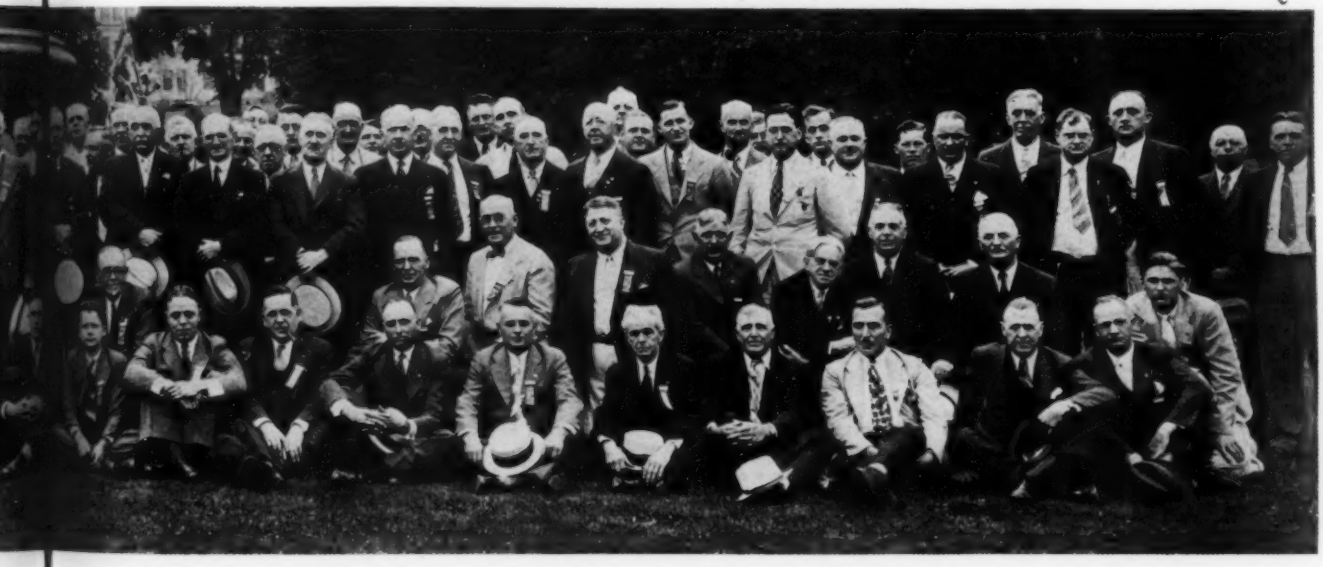
The past presidents were introduced and then the annual memorial services were started with a selection by a quartet. This was followed by the reading of the roll of deceased members of the past year by Secretary John W. O'Hearn, of Watertown, Mass.

Rt. Rev. William H. Flynn, of St. Patrick's church in Hartford. A solo, selection by the quartet, and benediction closed the exercises.

### Forest Fire Wardens' Session

The afternoon session opened at 2 o'clock in the armory, where all the subsequent meetings were held. President DeCourcy introduced A. F. Hawes, State Forester of Connecticut, who presided at the Forest Fire Wardens' Section. Mr. Hawes told of the good results achieved by the co-ordination of the work of Forest Wardens and Fire Chiefs. He told of the problems caused by brush fires in suburban areas and of the menace to forests caused by town dumps adjacent to wooded areas. He pointed out that scarred fire areas mar the scenic value of the countryside and told of the hazard of dead trees caused by the chestnut blight some years ago. He emphasized the part that forests play in preventing floods and soil erosion.

John P. Crowe, Assistant Forest Fire Warden of Massachusetts. He said that 498 water holes had been built in the past three years in Southeastern Massachusetts. These proved invaluable as a source of water supply, both for fighting woods fires and for protecting farm property and buildings from fire. Mr. Crowe told where and how to build water holes and advised making them deep. He said the value of water holes is not yet sufficiently appreciated and that they will put a stop to the deadly menace of back-firing. He said that at present Civilian Conservation Corps workers could not be used to construct water holes, except on state or national forest areas, but that it was hoped this regulation would be changed. In reply to a question the speaker said he would recommend that water holes should have a capacity of not less than 6,000 gallons. Chief Randlett, of Richmond, Me., and Chief James Taylor, of Bourne, Mass., took part in discussion of the paper.



onventi of the New England Association of Fire Chiefs, Held at the Hotel Bond, Hartford, Conn., on June 23, 24 and 25.

Chief Mellen R. Joy, Saugus, Mass.; Chief Carleton W. Maxim, Middleboro, Mass.; Ex-Chief Howard L. Stanton, Norwich, Conn.; Chief William S. Mason, Bangor, Me.; Ex-Chief William E. Titus, Pawtucket, R. I.; Chief Dean R. Miller, Ashland, Mass.; Walter L. Wedger, Belmont, Mass.; and Ex-Chief Irving F. Patt, Central Falls, R. I.

As each name was called a brief eulogy was read and then portraits were shown on the screen. Chief William C. Mahoney, Peabody, Mass., read the eulogy of Chief Joy; Chief O'Hearn read the eulogy of Chief Maxim; Chief Henry R. Taft, Norwich, Conn., read the eulogy of Ex-Chief Stanton; Chief Randlette read the eulogy of Chief Mason; Chief John A. Savage, Valley Falls, R. I., read the eulogies of Chief Titus and Ex-Chief Patt; Chief Thomas F. Slaman, Wellesley, Mass., read the eulogy of Chief Miller; and Chief Allen read the eulogy of Walter L. Wedger.

Taps were sounded by a bugler and there was another selection by the quartet. A memorial address was given by

### Forest Fire Control in Connecticut

The first paper was on "Methods of Fire Control in Connecticut," by C. H. Lathrop, Assistant State Forest Fire Warden of Connecticut. The speaker described the system used in combatting forest fires in the state and said that gasoline pumps and knapsack type hand pumps had been found effective. He told of the fire lookout towers maintained by the state and said that each forest warden was furnished with two hand pumps, three fire tools, three shovels and three brooms, and that eight tower pumps were available for use at large fires. He said that the Indian Fire Pumps made by the D. B. Smith Company, of Utica, N. Y., were used and had proved efficient.

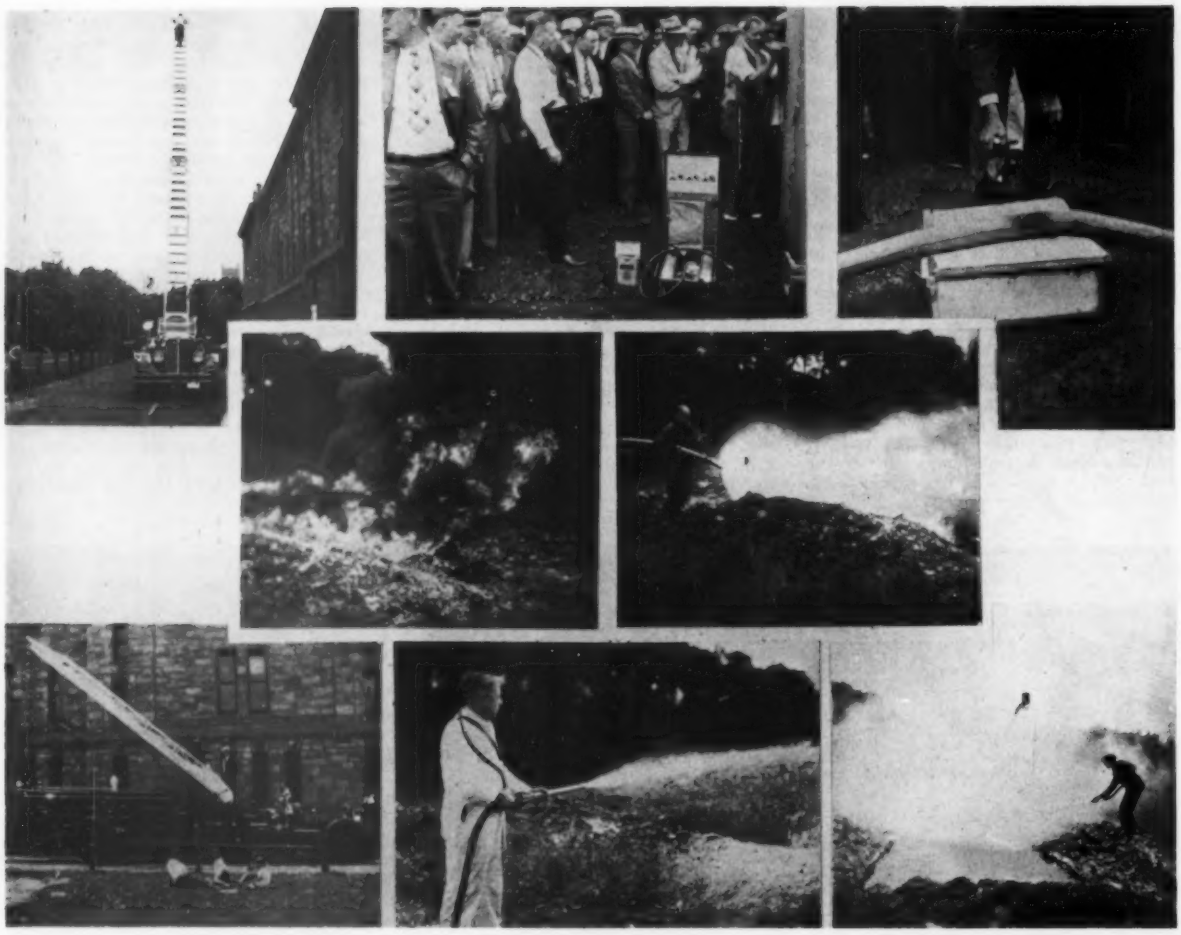
### Value of Water Holes

The second paper was on "The Construction and Use of Water Holes," by

The next speaker was Crosby Hoar, of the United States Forest Service, Washington, D. C. He described the great forest fire that destroyed the town of Hinkley, Minn., in 1894, and said that federal forestry officials are keenly on the lookout for new fire-fighting tools and devices.

### Forest Fire Fighting in Massachusetts

"Thirty Years in Forest Fire Fighting" was the subject of the talk given by Maxwell C. Hutchins, State Fire Warden of Massachusetts. He told of his appointment as Assistant Fire Warden in New York State in 1904 and described the Long Lake West Fire in the Adirondacks, which swept over 30,000 acres of forest and destroyed a town. In those days 83 per cent of the forest fires were caused by railway locomotives. Only shovels were used for equipment in fighting the fire. Mr. Hutchins told of the inspection of loco-



**Some of the Interesting Equipment Demonstrations at the New England Fire Chiefs' Convention.**

Upper and lower left—Seagrave all-steel aerial ladder with one man control, in fully and partly extended positions; top center—Guinea pig placed in larger air-tight box filled with carbon monoxide from car exhaust was revived with an H-H Inhalator; top right—To show, among other things, the non-burning feature of linen-lined hose, blow torch was applied for several minutes to a length under pressure, without any apparent damage to fabric; center right—Fog nozzle, in the hands of a Hartford fireman, makes quick work of the hot oil fire shown at left; bottom center—New Pyrene Phomaire nozzle, which produces a foam mixture, effectively extinguished various types of fires; bottom right—Garrison Du-Gas dry powder extinguisher putting the finishing touches to pit of blazing oil.

motives, which showed 70 per cent to be defective and of the adoption of strict rules for spark arresters on the stacks and other protective devices. In 1911 he came to Massachusetts and has been State Fire Warden ever since. He told of the building of fire observation towers and of the improvement in fire-fighting equipment. In Massachusetts each town appoints its own Forest Wardens and the state pays half the cost of all forest fire equipment purchased. There are 175 Fire Chiefs who also serve as Forest Wardens. Mr. Hutchins said that five towers and three patrol cars have been equipped with radio this year and that it has proved highly successful. He advocated the establishment of training schools for forest wardens and said the nine wardens' associations in the state had proved of great value

## Radio in Forest Fire Control

C. L. Graham, Supervisor of the White Mountain National Forest, read a paper on "Use of Radio in Forest Fire Control," and this was followed by a demonstration of the two-way radio telephone sets used by the U. S. Forest Service. Mr. Graham showed a large map of the Cumberland National Forest in Kentucky, where 18 lookout towers are equipped with high frequency radio, which has been used with much success for communication in a region not equipped with telephones.

In the rear of the armory at the conclusion of the meeting there was a demonstration of forest fire pumps. A new truck of the Massachusetts Department of Conservation and a truck of the Connecticut Forestry Department were on exhibition and the Gorham Fire Equipment Company demonstrated a new portable gasoline pump.

The Connecticut fire truck was on a Reo Speed Wagon chassis and carried a portable gasoline pump driven by an Austin motor, Indian fire pumps and supply cans, fire tools, Neidner hose containers, 5,000 feet of one-inch hose and 1,200 feet of inch and a half hose.

The Massachusetts truck had a Ford V-8 body and was equipped with a 125 gallon water tank and Darley booster gasoline pump, a Fitz-Henry Guptil portable gasoline pump, Indian fire pumps, fire tools, 4,500 feet of inch hose, and 500 feet of inch and a half hose. The truck had dual wheels in the rear.

The Gorham portable unit was fitted with an 8 horsepower Austin motor and an Oberdorfer pump, with capacity of 100 gallons per minute. The entire weight of the unit was only 225 pounds.

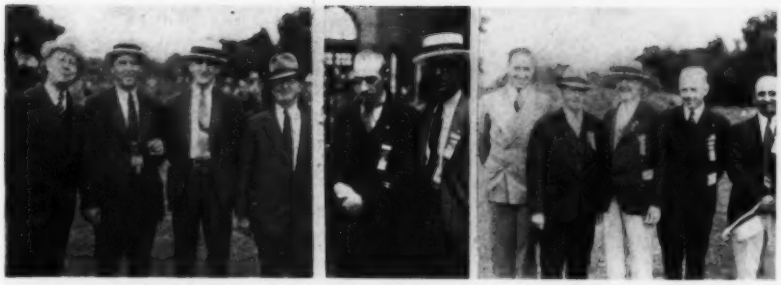
## Telegrams of Greeting Received

At the Tuesday evening meeting Secretary O'Hearn read telegrams of greeting from Miss Nell Anthony, Washington, D. C., an associate member; from Chief Ray Tiller, Waterloo, Ia., representing the Missouri Valley Fire Chiefs' Association; and Chief George Danberry, Secretary of the Wisconsin-Great Lakes Association.

It was voted to endorse the candidacy of Chief Roy Motesheard, Dearborn, Mich., for second vice-president of the International Association of Fire Chiefs at the Toronto Convention.

## Flood Experiences in Massachusetts

Chief Herbert C. Root, Springfield, Mass., gave a graphic description of his



**Snapped Here and There at the New England Convention**

L. to r.—Left, S. G. Langher, U. S. Fire Equip. Co.; C. H. Barker, Boston Coupling Co.; J. M. Love, Akron Brass Co.; J. J. Barker, Boston Coupling Co. Center—Frank Gillooly, Federal Electric Co., N. Y.; E. A. Oldack, Conn. Fire Equip. Co., Bridgeport. Left—Stephen Pachl, New Haven, Conn.; Chief M. W. Lawton, Middletown, Conn.; Chief J. J. Luby, Wallingford, Conn.; Chief J. S. Pachl, Annex, New Haven; J. J. Zawiza, Middletown.

experiences in the recent New England Flood. He told of the vain attempt made to keep the rising water out of the municipal electric light plant and how the Fire Department pumper was finally submerged and had to be temporarily abandoned. He described the difficulties in fighting a serious fire that broke out in a drop forge plant which was surrounded by water. Both platoons of the Springfield Fire Department remained on duty for six full days. The firemen were forced to vacate the No. 12 fire station and later the Dwight Street Station and the North Main Street Station, where the repair shops are located. It was eight and a half days before the electric light service was fully restored. Portable units sent from Brookline and Boston rendered valuable service, the Chief said. As a suggestion for emergency equipment to use in a future flood the Chief believed rafts large enough to carry a pumper might be feasible.

## Chief Moran on the Hartford Flood

The next speaker on "Flood Experiences and How I Would Meet Such Conditions in the Future" was Chief John C. Moran, of Hartford. He gave an account of the flood situation in Hartford and of the part played by the Fire Department, when the city was plunged into darkness. The use of candles proved a hazard and caused several fires. It was necessary to abandon the No. 6 Fire Station because of flood damage and the water rose to a depth of two and a half feet over the floor of fire headquarters. More than 40,000 telephones were put out of service. The Chief recommended that all gasoline and oil tanks should be so fixed that they could not be dislodged by a flood.

## Other Papers at the Session

Francis E. Stern spoke on "Carene—A Safe Refrigerant." John P. Crowe, Assistant State Fire Warden of Massachusetts, spoke on "The Adaptability of Standard Iron Pipe Size Threads for Small Hose," but advised against any change from the standard threads now in use.

Supt. Lorton C. Walden, of the Worcester, Mass., Protective Department, gave a talk on salvage works and a demonstration of spreading covers to prevent damage from water. In this he was assisted by members of the Insurance Fire Patrol of Worcester. The covers used were 18 by 12 feet in size and weighed 27 pounds each.

The papers on "Flood Experiences" by Chief Rufus A. Crittenden, of Haverhill, Mass., and on "How 100 Per Cent Volunteer Fire Departments Should Function," by Chief George E. Brencher, of Darien, Conn., were received and will be printed in the convention proceedings, but were not read because of lack of time.

The session closed with an illustrated lecture entitled "Turquoise Trails to New Mexico," by Alton Hall Blackington.

At the opening of the Wednesday morning meeting Secretary O'Hearn reported that the Committee on Connection of Auxiliary Fire Alarm Systems to Municipal Circuits recommended that no action be taken in the matter at the present time. This committee was composed of Chief Selden R. Allen, Brookline, Mass.; Chief William C. Mahoney, Peabody, Mass.; and Chief Frank F. Dickinson, Brockton, Mass.

Chief O'Hearn announced that demonstrations would be held in the afternoon in the rear of the armory by the Mine Safety Appliance Company, the Garrison Engineering Corporation, Pyrene Manufacturing Company, American Fire Hose Company, and the Fog Nozzle Company.

## Vocational Training for Firemen

Plans for the Toronto Convention were outlined and then the Firemen's Educational Section of the program was opened with an inspiring and informative address by Robert O. Small, Director of the Division of Vocational Training of the Massachusetts Department of Education.

M. Norcross Stratton, Supervisor of the Firemen's Training Classes, spoke on "Highlights of the Zone School Program in Massachusetts." He told of the Fire Department Instructors' Association, which is composed of 30 drill masters, who teach the classes. He said the bulletins for study and the drill masters' manual issued by the department of education had proved of great value. A total of 1,532 firemen have attended the zone schools in the past three years. Men have come to the schools from 216 towns and 102 towns have established local drills as a result of the zone schools.

## Conference of Drill Masters

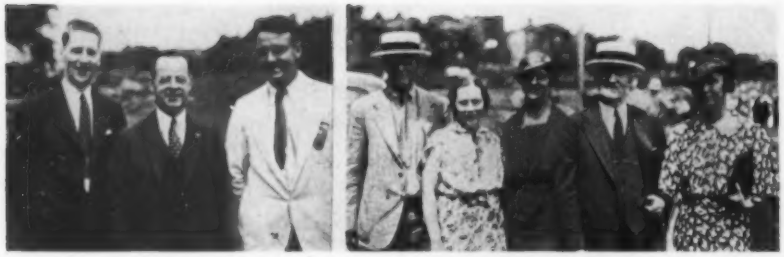
In the afternoon a conference of drill masters from the Massachusetts zone schools was conducted, under supervision of Mr. Stratton. The conference dealt with problems confronting supervisors and instructors in the schools as follows:

1. The problem of "what to teach," a problem of selection of instruction content.
2. The problem of "when to teach it," a problem of organization of content.
3. The problem of "how to teach it," a problem of methods for teaching fire work.
4. The use of the specialist in the zone school.

While the drill masters were in session in the downstairs hall another meeting was held on the main floor of the armory. Because of the difficult acoustics in the upper hall instruments of the Talk-Alarm Company and later

**Officers New England Association of Fire Chiefs and Hartford Convention Host**

Left to right—Chief D. H. DeCourcey, Winchester, Mass., retiring President; Chief Carl Stockwell, Burlington, Vt., newly-elected President; Chief J. W. Randlette, Richmond, Me., First Vice-Pres.; Chief John O'Hearn, Watertown, Mass., Secy.-Treas.; Chief W. T. Happny, Concord, N. H.; Sergeant-at-arms. Center—Chief John C. Moran of Hartford, who did a splendid job in handling the visitors. Right—Directors, Chief A. J. Cote, Woonsocket, R. I.; Chief M. W. Lawton, Middletown, Conn.; Chief A. H. Koltonski, Rutland, Vt.; Chief W. C. Mahoney, Peabody, Mass.



**A Few Well-Known Figures at the Hartford Convention**

L. to r., Left—A. L. Cowles, N. E. Mgr., J. H. Green, Gen'l Mgr., and A. Schofield, Eureka Fire Hose Co.. Right—Mr. & Mrs. Harry Belknap, Boston; Mrs. & Chief Selden R. Allen and Mrs. Wm. Bain of Brookline, Mass.

of the Station to Station Amplification System were used to assist the speakers.

## Demonstrations by Manufacturers

A large crowd witnessed the demonstrations which were held in the rear of the armory at 1 P. M. The Mine Safety Appliance Company put on a novel stunt in which a guinea pig was placed in a model house, made unconscious from carbon monoxide fumes from a motor exhaust, and then revived with an H and H inhalator.

The Pyrene Manufacturing Company exhibited the new Phomaire play pipe for extinguishing oil and gasoline fires. Harold Rehmann, of Newark, and Clarence J. McClaskey, of Revere, Mass., were in charge of the demonstration and covered a pile of burning boxes and crates with a heavy coating of foam which quickly extinguished the fire that had been kindled with gasoline and oil spread over the other inflammable materials.

The Garrison Engineering Corporation showed the efficiency of Du-Gas in extinguishing first a fire from dripping gasoline in an elevated barrel and then in putting out a raging blaze from a large pit filled with gasoline and fuel oil.

The American Fire Hose Company, of Philadelphia, Pa., demonstrated its new linen lined cotton fire hose and the Fog Nozzle Company of California displayed its new type of nozzle for fighting fires with water fog.

## The Chief and the Public

The first speaker at the afternoon session was John Ashmead, Advertising Manager of the Phoenix Insurance Company, of Hartford. His subject was "The Fire Chief and the Public."

He said the Chiefs should make use of newspapers and radio in spreading information for the welfare of the public. He said that if Chiefs were familiar with insurance policy clauses, they could advise householders against acts that would void the policies.

Mr. Ashmead told of the campaign against arson conducted by the National Board of Fire Underwriters and said this had been of great value to the Fire Chiefs and resulted in a large reduction in losses.

Chief William C. Mahoney of Peabody, Mass., spoke on "First Aid for Burns." He described the characteristics of first, second and third degree burns and the use of gentian violet for treating them.

## Re-rating of Pumpers

Percy C. Charnock, Manager of the Municipal Protection Department of the New England Insurance Exchange, gave an address on "Re-Rating of Pumpers." He reviewed the history of pumping units from the days of the first, extra first, and double extra first sized steam fire engines and told of the specifications drawn up in 1912 by Mr. Booth, National Board, for rating gasoline pumping engines. In 1914 it was required that the pumps must operate at 120 pounds net pressure for 6 hours. Recent specifications drawn up by the New York Fire Department call for higher pressures, but Mr. Charnock does not believe there is any need at present for a revision of the rating formulas now in use.

The next speaker was Commissioner Paul G. Kirk, of the Massachusetts Department of Public Safety. He expressed his admiration for the standards of efficiency and progress which the New England Association of Fire Chiefs represents and extended the thanks of the Commonwealth for the emergency service rendered by Fire Departments during the floods.

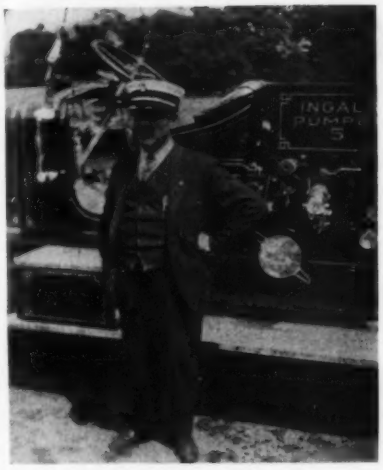
Stephen C. Garrity, Massachusetts State Fire Marshal, next addressed the

**Some of the Prominent Fire Equipment Manufacturers at the New England Convention**

Left (l. to r.) The Gamewell contingent—Geo. W. Morley, in charge public relations; R. A. Glenn, sales engr.; E. J. McCarthy, gen'l sales mgr.; F. T. Tiffany, sales engr. Center, Seagrave—Lester Stevenson, sales mgr.; J. H. Story, F. E. Taft, H. Y. Ensign, Phil Putney, Charles Blomquist. Right, American Steam Pump—B. D. Barton, T. E. Morford, C. D. Farrar.

**Some Prominent Members and Guests at the New England Convention**

L. to r.—Left—Sheriff L. A. Hapgood and Chief Sam'l Daoust, Marlboro, Mass.; Chief C. L. McCarthy, Worcester, Mass.; Chief Arthur Belmore, Webster, Mass. Center—State Fire Marshal Jay W. Stevens, San Francisco, Cal.; Chief Selden R. Allen, Brookline, Mass.; Ex-Deputy Chief Thos. Dougherty, New York; Chief Dan'l B. Tierney, Arlington, Mass., Chairman Exhibit Committee. Right—Col. Paul G. Kirk, Com'r Public Safety of Mass., Boston; A. Sunderland, Com'r Conn. State Police, Hartford; Stephen C. Garrity, Mass. State Fire Marshal, Boston; Geo. O. Mansfield, Mass. Chief of Arson Investigation, Boston.




**Chief Francis Ingals, Famous One-Man Fire Department of Guilford, Conn., Brought Three Pieces of Fire Apparatus, Which He Owns, to the New England Chiefs' Convention.**

meeting. He asked the Chiefs to fill out inventory blanks sent out by his office, so that a complete list of available apparatus and other equipment may be kept on file at the State House.

Anthony Sunderland, head of the Connecticut State Police, was then introduced, but did not make an address.

The paper by D. C. Fenner, Vice-President of the Mack International Motor Truck Corporation, on "The Past, Present and Future of Motor Fire Apparatus—Where Are We Drifting?" was received and will be printed in the proceedings, but was not read. Mr. Fenner was unable to be present.

The first speaker was Dr. Harry M. Archer, Honorary Deputy Chief of the New York Fire Department and President of the International Association of Police and Fire Surgeons. His subject was "Smoke and Gas Narcosis-Resuscitation."

The doctor described the following gases and gave the antidotes: hydrocyanic acid, nitric acid, ammonia, chlorine, and carbon monoxide. He exhibited a carbon monoxide detector made by the Mine Safety Appliance Company and explained how an inhalator works. In closing, he extended an invitation to the convention of the Police and Fire Surgeons, which will be held in New Haven, Conn., on October 24, 25, and 26.

The address was considered of such importance that it was voted to have it printed in pamphlet form and have a copy mailed to each member of the association.

T. Alfred Fleming, director of conservation of the National Board of Fire Underwriters, was the next speaker. He gave an address of unusual interest in which he pointed out the hazards of faulty building construction and said that air conditioning ducts had introduced a new danger as these formed ready flues for the passage of smoke and flame. He advocated more thermostatic and sprinkler alarms and said that delayed notification was responsible for many large fires. He spoke of fires caused by dust explosions and mentioned several instances of fires caused by use of a new form of petroleum.

*(Proceeding continued in next issue.)*

## New York Chiefs Meet

A round table discussion of fire problems was one of the features of the thirtieth annual convention of the New York State Association of Fire Chiefs held at Kingston, N. Y., June 3-5.

Chief Edward Gieselman, Syracuse was elected President; Chief Arthur Chambers, Yonkers, First Vice-President; Chief Raymond J. Kirsch, Kenmore, Second Vice-President; Chief Chris W. Noll, Poughkeepsie, re-elected Secretary-Treasurer.

Chief H. Abbot Griffen, White Plains, spoke on "Outside Assistance." He said, "A Chief should no more hesitate to call for his neighbor's help than to pull a second alarm in his city."

Chief Gieselman spoke on "Enforcing Fire Prevention Regulations." He said that all dry cleaning places in the city are inspected regularly. He touched on the inspection of schools, theatres, and places of public assembly.

Chief Fleming, Albany, reported that fifty-seven bills had been introduced in the Senate pertaining to firemanic matters. Of this total, twenty-five did not pass, one was vetoed, and twenty-two became law. Eight are still waiting for the Governor's action. In the assembly, fifty-five bills were introduced, of which thirty-two did not pass, one was vetoed, fifteen became law, and eight are with the Governor.

Chief William J. Gates, Glens Falls, spoke on grass fires, and how to prevent them.

## Fairfield Chiefs Hold Last Meeting of Season

Seth G. Cole, attorney for the New York State Firemen's Association and Judge Harry Hoop, ex-President of the New York State Firemen's Association, were the principal speakers at the June meeting of the Fairfield County Fire Chiefs' Emergency Plan, held in the Belltown School, Stamford, Conn., on Wednesday, June 17.

"Firematic Legislation" was the topic of the evening and Judge Hoop, reviewed the history of the New York State Firemen's Home in Hudson, N. Y., how it was established and how it was maintained. He revealed that two of Connecticut's sister states, namely New York and New Jersey, had homes of this kind, both operating on the two per cent insurance tax collected on premiums of foreign insurance companies in their respective states.

Seth Cole discussed the favorable legislation passed in New York for volunteer firemen. He discussed the benefits disabled firemen or relatives of deceased, firemen receive in his state and at the suggestion from the floor, compared them with those received in Connecticut, which are about one-third less.

He explained the operation of the two per cent tax, revealing that 90 per cent of the tax collected in each town or city goes to the volunteer fire company, or in the case of a paid department, goes to the municipality, while the other 10 per cent is used to defray expenses at the firemen's home in Hudson. Six hundred thousand dollars was collected through this tax in New York last year.

Following his talk numerous questions were asked from the floor. It was revealed that the state of Connecticut collected from $718,000 to $851,000 during the years, 1931 to 1934. These figures were released by Chief George Brencher, of the Plan's Legislative Committee; the figures being received directly from State Tax Commissioner Hackett. The State in return appropriates approximately $16,000 annually to the State Firemen's Association for firemen's benefits. A round of applause greeted Mr. Cole's answer to a question from the floor whether we shouldn't be satisfied with the treatment received from the state returning $16,000 for benefits. His answer was:

"It seems to me that a state receiving such a large amount in taxes isn't returning too much when they appropriate but $16,000 of this total."

Standing Committees, as appointed by himself, were announced by President Stapely, who presided over his first meeting.

Others heard on the evening's program were: Second Selectman Frank McMahon and Third Selectman William Joyce, who officially extended the welcome of the town officials to the visiting firemen; Chief James Morris, Belltown Fire Department, extending the welcome of the local Fire Department and Joseph Zone, Town Treasurer.

The meeting voted to hold its October meeting on the 28th at Nichols, Conn. Following the meeting refreshments were served.

## Maryland Firemen Gather at Hagerstown

J. Millard Tawes, of Crisfield, was elected President of the Maryland State Volunteer Firemen's Association at the annual convention which was held at Hagerstown. Earl Strange, Eastport, was re-elected First Vice-President; E. B. Miller, Sr., Sparrows Point, Second Vice-President; Frank W. Truitt, Ocean City, re-elected Treasurer, and George R. Lindsay, re-elected Secretary.

The list of speakers included A. F. Pollack, Secretary, University of Maryland; Alfred Sharpe, President, Board of Fire Commisisoners, Baltimore; Howard Travers, Chief, Baltimore; C. F. Reininger, Charleston, W. Va., President of the West Virginia Firemen's Association, and George Ward, Baltimore County, Past-President of the association. The next convention will be held at Easton.

## Eleven Firemen Felled at N. Y. Waterfront Fire

Thirty-two pieces of fire apparatus, and two fireboats were used to fight a fire which started in a grain elevator on the East River waterfront of New York City. Eleven firemen were overcome by smoke.

Fire was discovered at 8:30 p.m. by the watchman. After turning in an alarm, he ran to the sixth floor where the fire had started, and he found that the entire building was threatened. Smoke issued in such volume that firemen who "rolled in" on the first two alarms, were ordered out of the burning building.

At 10:30 p.m., the fire was considered under control. Shortly afterwards the roof collapsed. Windows were closed at the Bellevue Hospital nearby to keep the smoke out of the wards.

The cause of the fire has not been determined.

# Many Departments Deficient in Quantity and Quality of Hose

## Shortage in Supply and Weakened Condition of Hose in Service Impose Severe Handicap on Fire Fighting Organizations

THE fire alarm system has been aptly called the nerve system of the Fire Department, with the fire alarm headquarters as the brains. The pumper has been commonly likened to the heart of the fire-fighting organization. Hence the hose line might well be classed as the arteries. Failure of these arteries in fire fighting is correspondingly as serious to a city as the breakdown of the arteries is to the human body. Each is equally vital to the security of the system.

In order to determine the present status of the supply and condition of hose in American Fire Departments, a survey covering some 600 cities was recently made. These cities represent a total population of over 28,000,000.

Conspicuous in the data received is the discrepancy in fire hose supplies of cities of equal size. For example, one city of 400,000 population had forty per cent more hose than another city of like size.

Of the hose in service in the above mentioned group of cities, approximately half was five or more years old. About 10 per cent was reported as needing immediate replacement.

In the matter of determining when hose needs to be replaced, various methods of testing are followed, and various periods elapse between tests. Of those reporting, four test the hose every two years; 219 test it annually; 191 test it semi-annually; 36, quarterly; five, bi-monthly; ten, monthly; and three, weekly.

Of much greater importance and interest are the pressures to which hose is subjected in these tests. They range from 45 pounds to 400 pounds per square inch. 370 cities of the 478 reporting the test pressures employ test pressures of 150 to 300 pounds.

The practices of all those reporting, insofar as test pressures are concerned, is shown in the table in the next column.

As noted above, pressures from 150 to 300 pounds are most commonly used. Those testing at 150, 200, 250 and 300 pounds total 370 out of the 478.

On the question of test pressures, it seems that the pressures commonly employed are too low. The largest number test at 200 pounds pressure. Such a pressure seems insufficient. Any fire that requires operation from the street needs a nozzle pressure of at least 50 pounds, and one and one quarter-inch tip is usually employed.

| Test Pressure in Pounds per Square Inch | Number of Departments testing at this Pressure | Test Pressure in Pounds per Square Inch | Number of Departments testing at this Pressure |
|---|---|---|---|
| 45 | 1 | 160 | 1 |
| 50 | 2 | 175 | 4 |
| 55 | 1 | 180 | 7 |
| 60 | 3 | 200 | 173 |
| 75 | 2 | 210 | 1 |
| 80 | 1 | 220 | 2 |
| 85 | 3 | 225 | 9 |
| 90 | 5 | 240 | 3 |
| 100 | 16 | 250 | 101 |
| 110 | 3 | 270 | 1 |
| 120 | 10 | 275 | 2 |
| 125 | 5 | 300 | 46 |
| 130 | 1 | 325 | 2 |
| 135 | 1 | 350 | 12 |
| 150 | 50 | 400 | 10 |

If 600 foot stretch of hose is used with 1¼-inch nozzle at 50 pounds, the engine pressure required is 203 pounds.

If 800 feet stretch is employed, with 1¼-inch nozzle and 50 pounds nozzle pressure, the engine pressure would have to be 228 pounds; while with 1,000 feet in use, the engine pressure would have to be 303 pounds. All of these figures are for horizontal lines and do not take into account elevation of the nozzle above the engine. If the nozzle is in operation on one of the upper floors of the building, the "back pressure" would have to be added to the figures given for engine pressure to secure the correct engine pressure.

As stretches of 600 feet are common at the type of fire described, where several engines are at work, it is evident that a test of hose at 200 pounds pressure would not insure sufficient margin of strength. For if tests are made annually or semi-annually, then there would be a deterioration in the strength of the hose of several pounds in the interim and if the hose were used at a fire such as outlined above, just prior to a test, there is likelihood of some of the hose bursting.

After all, the small amount of additional use secured from the hose by permitting it to be employed when its strength is questionable is far outweighed by the additional damage which would be produced by hose line bursting at a critical time during fire-fighting operations. A test pressure of 250 pounds would be the minimum the writer would recommend, and if a department wants to be on safe ground at all times, and avoid bursting of hose at severe fires, a pressure of 300 pounds would not be excessive.

Pumping engines as found in the fire service today are capable of easily delivering pressures well above the bursting pressure of hose, so that the standards enforced years ago are surely not applicable today. The speed at which motor apparatus covers territory has resulted in Fire Departments rendering service to outlying communities and suburban factories, dwellings, etc. Long stretches are therefore common and, hence, higher pressures than were usually employed in the days of steamers may be imposed on the hose. A test pressure of 200 pounds was probably satisfactory in the latter period, but today, with new developments in pumping, a greater margin of safety is necessary.

In the tabulation shown on the following pages, data on hose in ser-

(Continued on page 315)

**Record of Hose in Service in Approximately 600 Cities, with a Total Population of Over 28,000,000**

| Size | No. of Feet in service 6/1/36 | No. of Feet 5 or more yrs. old (approx.) | No. of Feet bought last 3 years. | How Much should be replaced? |
|---|---|---|---|---|
| 3½" | 112,110 | 81,470 | 19,795 | 6,650 |
| 3" | 346,626 | 193,885 | 64,110 | 42,630 |
| 2½" | 5,690,758 | 2,825,043 | 1,597,577 | 539,650 |
| 1½" | 529,338 | 191,550 | 144,850 | 28,850 |
| 1" | 317,100 | 92,150 | 99,650 | 21,400 |
| Other sizes | 305,215 | 39,790 | 72,630 | 10,760 |

## Hose in Service in Some of the Leading American Fire Departments.

| City and State | Population in Thousands | 3½" Feet | 3" Feet | 2½" Feet | 1½" Feet | 1" Feet | Other Sizes—Feet |
|---|---|---|---|---|---|---|---|
| New York City, N. Y. | 6,506 | 38,850 | 134,350 | 728,700 | 167,600 | .... | 900[1] |
| Detroit, Mich. | 1,565 | 740 | 30,450 | 111,900 | 200 | 15,850 | 2,380 |
| San Francisco, Calif. | 710 | 28,400 | 1,500 | .... | 23,200 | 7,300 | 120,750[2] |
| Boston, Mass. | 795 | 7,567 | 34,100 | 120,150 | .... | 1,000 | 23,050[3] |
| Pittsburgh, Penn. | 700 | .... | 8,100 | 127,350 | .... | 11,050 | .... |
| Buffalo, N. Y. | 599 | 8,370 | .... | 90,561 | .... | 8,000 | .... |
| Washington, D.C. | 594 | .... | .... | 186,500 | .... | 22,600 | .... |
| Minneapolis, Minn. | 486 | 163 | 15,021 | 75,522 | 28,288 | .... | 3,760[3] |
| Newark, N. J. | 444 | .... | .... | 76,000 | 7,800 | .... | .... |
| Rochester, N. Y. | 328 | 50 | 1,250 | 29,650 | .... | 7,500 | .... |
| Toledo, Ohio | 309 | .... | .... | 42,000 | .... | .... | .... |
| Louisville, Ky. | 307 | .... | 800 | 47,000 | .... | 6,000 | .... |
| Columbus, Ohio | 297 | .... | .... | 41,500 | .... | 5,050 | .... |
| Birmingham, Ala. | 275 | .... | 4,400 | 59,550 | 2,500 | .... | .... |
| Providence, R. I. | 259 | .... | .... | 63,550 | .... | .... | 7,900[3] |
| Richmond, Va. | 200 | .... | 6,000 | 30,000 | .... | 4,000 | 2,250 |
| Worcester, Mass. | 195 | .... | 1,500 | 32,500 | 1,000 | 5,550 | .... |
| Youngstown, Ohio | 185 | .... | 1,000 | 23,000 | 400 | .... | 2,300[3] |
| Oklahoma City, Okla. | 182 | 2,000 | 8,300 | 36,300 | 7,700 | 2,600 | .... |
| Miami, Fla. | 181 | .... | 1,800 | 29,900 | 2,550 | .... | 2,500[3] |
| Ft. Worth, Tex. | 170 | .... | .... | 43,000 | 4,500 | .... | 3,000[3] |
| Grand Rapids, Mich. | 168 | .... | 7,000 | 28,000 | 250 | 3,000 | .... |
| New Haven, Conn. | 162 | .... | 100 | 50,400 | .... | 1,200 | 3,650[3] |
| Long Beach, Calif. | 162 | .... | 60 | 30,200 | 5,300 | 2,600 | 320[3] |
| Nashville, Tenn. | 160 | .... | .... | 38,000 | 400 | .... | 3,650[3] |
| Flint, Mich. | 156 | .... | .... | 24,000 | .... | .... | .... |
| Yonkers, N. Y. | 151 | .... | 500 | 21,000 | .... | .... | 4,000[3] |
| Bridgeport, Conn. | 147 | .... | .... | 25,500 | 1,450 | .... | 2,000[4] |
| Jacksonville, Fla. | 146 | .... | 5,000 | 30,200 | .... | 4,150 | .... |
| Des Moines, Iowa | 142 | .... | .... | 32,650 | .... | 1,000 | 3,200 |
| Tulsa, Okla. | 142 | .... | 21,900 | 4,100 | 2,400 | .... | 50[1] |
| Towson, Md. | 140 | .... | .... | 33,800 | 1,200 | 2,750 | .... |
| Norfolk, Va. | 130 | .... | 6,200 | 26,200 | .... | 1,450 | 4,600[5] |
| Spokane, Wash. | 125 | .... | 1,800 | 35,700 | 2,250 | 2,750 | .... |
| Trenton, N. J. | 123 | .... | .... | 32,750 | .... | 9,550 | .... |
| Kansas City, Mo. | 122 | .... | .... | 27,800 | .... | 3,000 | .... |
| Peoria, Ill. | 120 | .... | .... | 20,000 | .... | 2,000 | .... |
| Camden, N. J. | 119 | .... | .... | 21,000 | .... | .... | 5,300[3] |
| Cambridge, Mass. | 118 | .... | 200 | 19,500 | 600 | .... | 3,000[3] |
| Fall River, Mass. | 115 | .... | .... | 23,500 | .... | 6,000 | .... |
| Knoxville, Tenn. | 111 | .... | 2,000 | 23,000 | 200 | 2,600 | .... |
| Wilmington, Del. | 110 | .... | .... | 25,450 | 1,000 | 4,500 | .... |
| Evansville, Ind. | 107 | .... | .... | 26,000 | .... | 3,500 | .... |
| Tacoma, Wash. | 106 | .... | 2,000 | 49,100 | 4,300 | 4,300 | .... |
| So. Bend, Ind. | 105 | .... | .... | 27,500 | 2,150 | 2,350 | .... |
| Somerville, Mass. | 104 | .... | .... | 13,100 | 1,400 | 3,200 | .... |
| Utica, N. Y. | 103 | .... | 4,700 | 17,600 | .... | .... | 2,000 |
| El Paso Tex. | 103 | .... | .... | 22,550 | 4,000 | .... | .... |
| Duluth, Minn | 101 | .... | 100 | 31,500 | 3,750 | 2,000 | .... |
| Lowell, Mass. | 100 | .... | .... | .... | .... | .... | .... |
| Waterbury, Conn. | 99 | .... | .... | 21,150 | 2,350 | 200 | .... |
| Schenectady, N. Y. | 98 | .... | .... | 18,050 | .... | .... | 2,650 |
| Wilkes-Barre, Pa. | 90 | .... | 160 | 27,300 | .... | .... | .... |
| Charlotte, N. C. | 90 | .... | .... | 19,500 | .... | .... | .... |
| Lawrence, Mass. | 86 | .... | .... | 23,450 | .... | .... | 1,930[3] |
| Saginaw, Mich. | 85 | .... | 3,300 | 27,000 | 3,000 | 500 | .... |
| Sioux City, Iowa | 85 | .... | .... | 22,500 | .... | 1,000 | .... |
| Little Rock, Ark. | 81 | .... | 1,000 | 25,000 | 550 | .... | 1,800 |
| St. Joseph, Mo. | 80 | 50 | .... | 19,000 | 2,150 | 4,250 | .... |
| Huntington, W. Va. | 80 | .... | .... | 12,000 | 600 | .... | .... |
| Lincoln, Nebr. | 80 | .... | 1,700 | 24,110 | .... | .... | .... |
| Pasadena, Calif. | 80 | .... | 1,000 | 21,200 | 6,600 | 1,850 | .... |
| Quincy, Mass. | 79 | .... | 1,800 | 19,500 | 1,500 | .... | 3,900[3] |
| Manchester, N. H. | 77 | .... | 1,000 | 30,000 | .... | .... | 3,100 |
| Roanoke, Va. | 75 | .... | .... | 29,900 | 1,000 | 2,000 | .... |
| Charleston, W. Va. | 75 | .... | .... | 38,000 | 600 | .... | .... |
| Springfield, Ill. | 72 | .... | 1,000 | 15,600 | 1,200 | 500 | 1,500[3] |
| Dearborn, Mich. | 72 | .... | .... | 10,000 | 800 | .... | .... |

| City and State | Population in Thousands | 3½" Feet | 3" Feet | 2½" Feet | 1½" Feet | 1" Feet | Other Sizes—Feet |
|---|---|---|---|---|---|---|---|
| New Britain, Conn. | 71 | .... | 1,200 | 15,750 | .... | .... | 1,765 |
| Lakewood, Ohio | 70 | .... | .... | 8,000 | .... | 1,400 | .... |
| Topeka, Kans. | 70 | .... | .... | 20,200 | 600 | .... | 1,400 |
| Montgomery, Ala. | 70 | .... | 1,000 | 20,700 | 400 | 350 | .... |
| Cicero, Ill. | 70 | .... | .... | 13,000 | 1,200 | .... | .... |
| Springfield, Ohio | 70 | .... | .... | 10,750 | .... | .... | 1,600[3] |
| Oak Park, Ill. | 68 | .... | .... | 8,600 | 1,000 | 1,250 | .... |
| Racine, Wis. | 67 | .... | .... | 11,850 | .... | 1,200 | .... |
| Irvington, N. J. | 66 | .... | .... | 15,000 | .... | 650 | .... |
| Pontiac, Mich. | 65 | .... | .... | 17,000 | 500 | .... | .... |
| Hammond, Ind. | 65 | .... | .... | 14,000 | .... | 1,600 | .... |
| Mt. Vernon, N. Y. | 65 | .... | .... | 10,500 | .... | 1,300 | .... |
| Glendale, Calif. | 65 | .... | .... | 16,000 | 3,650 | .... | .... |
| Brockton, Mass. | 63 | .... | 1,750 | 20,000 | 2,100 | .... | 3,000 |
| Terre Haute, Ind. | 62 | .... | .... | 20,000 | 500 | 2,000 | .... |
| Wheeling, W. Va. | 62 | .... | .... | 19,150 | 400 | 600 | 1,570 |
| Medford, Mass. | 61 | .... | .... | 13,000 | 1,200 | .... | 1,650[3] |
| Union City, N. J. | 60 | .... | .... | 15,000 | 500 | .... | 1,300[3] |
| Malden, Mass. | 58 | .... | 100 | 15,000 | 3,000 | .... | 1,500[3] |
| Beaumont, Tex. | 58 | .... | 300 | 22,000 | 6,000 | 750 | 750 |
| Madison, Wis. | 57 | .... | .... | 15,000 | 1,000 | 2,100 | .... |
| Phoenix, Ariz. | 57 | .... | .... | 16,300 | 2,650 | 1,500 | .... |
| Holyoke, Mass. | 56 | .... | 3,150 | 17,600 | .... | 1,900 | .... |
| Fresno, Calif. | 55 | .... | .... | 29,400 | 4,250 | .... | 3,150[2] |
| Jackson, Mich. | 55 | .... | .... | 12,350 | .... | 500 | 1,200[1] |
| Macon, Ga. | 55 | .... | .... | 13,550 | .... | .... | .... |
| Pueblo, Colo. | 50 | .... | .... | 12,000 | .... | .... | .... |
| Everett, Mass. | 50 | .... | .... | 12,000 | 2,400 | .... | .... |
| Clifton, N. J. | 50 | .... | 50 | 12,900 | .... | .... | 900[3] |
| Elmira, N. Y. | 50 | .... | 1,650 | 7,400 | 400 | .... | 1,500[3] |
| Pittsfield, Mass. | 49 | 75 | .... | 11,000 | .... | 1,200 | .... |
| Haverhill, Mass. | 48 | .... | .... | 13,750 | 2,750 | .... | 2,350[6] |
| Aurora, Ill. | 48 | .... | 600 | 9,000 | 1,100 | 1,250 | .... |
| Bay City, Mich. | 48 | .... | .... | 19,950 | .... | 2,000 | .... |
| Upper Darby, Pa. | 46 | .... | .... | 10,000 | 1,000 | 600 | .... |
| Stamford, Conn. | 46 | .... | .... | 10,000 | .... | 1,700 | .... |
| Lexington, Ky. | 46 | .... | 75 | 18,400 | .... | 2,500 | .... |
| Montclair, N. J. | 46 | .... | .... | 9,850 | .... | .... | .... |
| Portsmouth, Va. | 45 | .... | .... | 10,400 | .... | .... | .... |
| Salem, Mass. | 43 | .... | 1,800 | 13,900 | .... | .... | 2,050[3] |
| St. Petersburg, Fla. | 43 | .... | .... | 15,650 | 800 | .... | .... |
| Poughkeepsie, N. Y. | 43 | .... | .... | 9,000 | .... | 1,000 | .... |
| Joliet, Ill. | 42 | .... | .... | 7,600 | 750 | 1,500 | .... |
| Portsmouth, Ohio | 42 | .... | 500 | 9,700 | 950 | 1,300 | .... |
| Dubuque, Iowa | 41 | .... | 50 | 12,650 | .... | 1,000 | .... |
| Fitchburg, Mass. | 41 | .... | .... | 12,000 | .... | .... | 2,300[3] |
| Meriden, Conn. | 40 | .... | .... | 7,950 | .... | 600 | .... |
| High Point, N. C. | 40 | .... | .... | 11,000 | .... | .... | .... |
| Santa Monica, Calif. | 40 | .... | .... | 10,000 | 2,400 | .... | .... |
| Bloomfield, N. J. | 40 | .... | .... | 6,200 | .... | .... | .... |
| Quincy, Ill. | 40 | .... | .... | 14,500 | .... | 2,300 | .... |
| Danville, Ill. | 40 | .... | .... | 5,000 | .... | 250 | 400[6] |
| E. Cleveland, Ohio. | 40 | .... | .... | 5,200 | .... | 500 | .... |
| Norwalk, Conn. | 40 | .... | .... | 9,000 | 600 | .... | .... |
| W. New York, N. J. | 39 | .... | .... | 10,000 | .... | .... | .... |
| Fargo, N. D. | 38 | .... | 400 | 7,000 | 200 | .... | .... |
| Cumberland, Md. | 37 | .... | .... | 10,000 | .... | .... | .... |
| Elgin, Ill. | 37 | .... | 350 | 9,500 | 900 | 200 | 1,000[3] |
| Auburn, N. Y. | 36 | .... | .... | 9,550 | .... | .... | 1,000[3] |
| Revere, Mass. | 36 | .... | 50 | 11,000 | 1,800 | 500 | 1,200[5] |
| Superior, Wis. | 36 | .... | .... | 12,165 | 1,150 | 900 | 500[3] |
| Norwood, Ohio | 36 | .... | .... | 6,000 | .... | 1,100 | .... |
| New London, Conn. | 35 | .... | 50 | 13,000 | 1,200 | .... | 1,000 |
| Amsterdam, N. Y. | 35 | .... | .... | 9,000 | .... | .... | .... |
| Colorado Springs, Colo. | 35 | .... | .... | 13,350 | 1,200 | .... | .... |
| Lewiston, Me. | 35 | .... | .... | 13,800 | 1,950 | .... | .... |
| Newark, Ohio | 35 | .... | .... | 5,400 | .... | 1,000 | .... |
| Bakersfield, Calif. | 35 | .... | .... | 10,000 | 3,000 | 2,000 | .... |
| Newport News, Va. | 34 | .... | .... | 13,850 | 200 | .... | 1,600[3] |

## Hose in Service in Some of the Leading American Fire Departments. (Continued)

| City and State | Population in Thousands | 3¼" Feet | 3" Feet | 2½" Feet | 1½" Feet | 1" Feet | Other Sizes—Feet |
|---|---|---|---|---|---|---|---|
| Laredo, Tex. | 34 | .... | .... | 1,800 | 1,000 | 300 | .... |
| Rome, N. Y. | 33 | .... | .... | 9,450 | .... | .... | .... |
| E. Providence, R. I. | 33 | .... | .... | 14,500 | 800 | 800 | 800[3] |
| Alexandria, Va. | 33 | .... | .... | 18,000 | .... | 1,700 | .... |
| Elkhart, Ind. | 32 | .... | .... | 12,000 | 700 | .... | .... |
| Newport, Ky. | 32 | .... | .... | 5,000 | 500 | 1,300 | .... |
| Muskogee, Okla. | 32 | .... | .... | 10,000 | .... | .... | 80[3] |
| Alton, Ill. | 31 | .... | .... | .... | .... | .... | .... |
| Bellingham, Wash. | 31 | .... | 850 | 8,550 | 1,350 | .... | .... |
| Newburg, N. Y. | 31 | .... | 100 | .... | .... | 200 | 1,200[3] |
| Wilkinsburg, Pa. | 30 | .... | .... | 5,000 | .... | .... | .... |
| Middletown, Ohio | 30 | .... | 100 | 7,000 | .... | 600 | .... |
| North Tonawanda, N. Y. | 30 | .... | .... | 15,300 | .... | 1,400 | .... |
| Mishawaka, Ind. | 29 | .... | .... | 10,000 | 1,600 | 1,400 | .... |
| Wyandotte, Mich. | 28 | .... | .... | 8,000 | .... | 300 | .... |
| Eau Claire, Wis. | 28 | .... | .... | 8,100 | 1,000 | 300 | .... |
| Linden, N. J. | 28 | .... | .... | 72,000 | .... | .... | .... |
| Massillon, Ohio | 28 | .... | .... | 6,500 | 100 | 150 | .... |
| Newport, R. I. | 27 | .... | .... | 17,000 | .... | 2,500 | .... |
| Ann Arbor, Mich. | 27 | .... | .... | 8,000 | 200 | .... | .... |
| Salem, Ore. | 27 | .... | .... | 13,500 | .... | .... | .... |
| Michigan City, Ind. | 27 | .... | .... | 7,100 | 1,400 | .... | .... |
| Appleton, Wis | 26 | .... | .... | 7,950 | 550 | 1,000 | .... |
| Lebanon, Pa. | 26 | .... | .... | 10,500 | .... | .... | 1,600 |
| San Angelo, Texas | 26 | .... | .... | 6,800 | 1,000 | 800 | .... |
| Middletown, Conn. | 26 | .... | .... | 7,500 | 1,100 | 150 | 550[3] |
| Johnson City, Tenn. | 25 | .... | .... | 6,800 | 500 | .... | .... |
| Oil City, Pa. | 25 | 7,000 | .... | 7,000 | .... | .... | 400[3] |
| Jackson, Tenn. | 25 | .... | .... | 9,000 | .... | .... | .... |
| Belmont, Mass. | 25 | .... | .... | 6,650 | 1,850 | 1,200 | .... |
| Granite City, Ill. | 25 | .... | .... | 4,000 | 400 | 600 | .... |
| Beverly Hills, Calif. | 25 | .... | 50 | 10,000 | 2,000 | 900 | 450[3] |
| Northampton, Mass. | 25 | .... | .... | 11,550 | 1,100 | 1,000 | 503[7] |
| Richmond, Calif. | 25 | .... | .... | 9,000 | 2,000 | .... | .... |
| Yakima, Wash. | 25 | .... | 600 | 10,900 | 1,850 | 1,000 | .... |
| Marion, Ind. | 25 | .... | 1,000 | 10,000 | 1,000 | .... | 1,000 |
| Lubbock, Texas | 25 | .... | .... | 6,500 | 1,300 | .... | .... |
| Pomona, Calif. | 24 | .... | .... | 5,300 | 1,450 | 600 | .... |
| Hannibal, Mo. | 23 | .... | .... | 3,000 | 350 | .... | 750 |
| Mason City, Iowa | 23 | .... | 800 | 4,800 | 1,900 | 400 | 400[3] |
| Manitowoc, Wis. | 23 | .... | .... | 6,850 | 200 | 800 | .... |
| Winona, Minn. | 23 | .... | 2,000 | 7,500 | 1,100 | .... | .... |
| Butler, Pa. | 23 | .... | .... | 9,000 | .... | .... | .... |
| Tuscaloosa, Ala. | 22 | .... | .... | 7,500 | .... | .... | 950[3] |
| North Adams, Mass. | 22 | .... | .... | 1,800 | 200 | .... | .... |
| Ft. Dodge, Iowa | 22 | .... | 50 | 6,750 | 1,000 | 600 | .... |
| Reno, Nev. | 22 | .... | .... | 9,500 | .... | 800 | .... |
| Peabody, Mass. | 22 | .... | 700 | 12,000 | 2,400 | 300 | 1,100 |
| Champaign, Ill. | 22 | .... | .... | 4,300 | .... | .... | .... |
| Methuen, Mass. | 21 | .... | .... | 6,000 | 1,000 | .... | 1,000[3] |
| Gardner, Mass. | 21 | .... | .... | 9,500 | .... | 3,500 | .... |
| Long Branch, N. J. | 21 | .... | .... | 10,000 | .... | 500 | 300 |
| Pine Bluff, Ark. | 20 | .... | .... | 4,000 | .... | .... | .... |
| Bessemer, Ala. | 20 | .... | .... | 7,450 | .... | .... | 1,000[3] |
| Hamden, Conn. | 20 | .... | .... | 10,800 | .... | .... | .... |
| Leavenworth, Kans. | 20 | .... | .... | 5,100 | .... | 250 | .... |
| Stratford, Conn. | 20 | .... | .... | 4,000 | 500 | .... | .... |
| Gastonia, N. C. | 20 | .... | .... | 8,000 | .... | .... | .... |
| Uniontown, Pa. | 20 | .... | .... | 4,500 | .... | .... | 600[3] |
| Billings, Mont. | 20 | .... | 1,000 | 4,000 | 300 | .... | .... |
| Marshalltown, Iowa | 20 | .... | 200 | 4,650 | 400 | 600 | .... |
| Blue Island, Ill. | 20 | .... | .... | 4,250 | .... | 200 | .... |
| Lancaster, Ohio | 20 | .... | .... | 3,600 | 500 | .... | .... |
| Johnson City, N. Y. | 19 | .... | .... | 12,300 | .... | .... | 800[3] |
| Westfield, Mass. | 18 | .... | 50 | 6,450 | 2,500 | 150 | 700[3] |
| Auburn, Maine | 18 | .... | 400 | 13,000 | 600 | .... | .... |
| Logansport, Ind. | 18 | .... | .... | 5,550 | 600 | 400 | 800 |
| Milton, Mass. | 18 | .... | .... | 7,250 | 900 | .... | 1,250 |
| Burlingame, Calif. | 18 | .... | .... | 4,000 | 2,100 | .... | .... |

| City and State | Population in Thousands | 3¼" Feet | 3" Feet | 2½" Feet | 1½" Feet | 1" Feet | Other Sizes—Feet |
|---|---|---|---|---|---|---|---|
| Decatur, Ala. | 18 | .... | .... | 5,000 | .... | 750 | .... |
| Longview, Tex. | 18 | .... | .... | 4,100 | 1,500 | 300 | .... |
| Vallejo, Calif. | 18 | .... | .... | 6,400 | 1,350 | 700 | .... |
| Augusta, Me. | 18 | .... | .... | 9,000 | 1,000 | .... | .... |
| Meadville, Pa. | 18 | .... | .... | 7,500 | .... | 200 | .... |
| San Mateo, Calif. | 18 | .... | .... | 4,000 | 1,400 | 900 | .... |
| Biddeford, Me. | 18 | .... | 50 | 10,000 | 1,000 | 800 | 200[3] |
| Englewood, N. J. | 17 | .... | 1,500 | 10,950 | .... | 150 | 550[3] |
| Hillside, N. J. | 17 | .... | 50 | 6,700 | 600 | 400 | .... |
| Ogdensburg, N. Y. | 17 | .... | .... | 5,500 | .... | .... | .... |
| Rutland, Vt. | 17 | .... | 600 | 8,000 | 700 | .... | 800[3] |
| Grand Forks, N. Dak. | 17 | .... | .... | 5,200 | 800 | 400 | .... |
| W. Springfield, Mass. | 17 | .... | .... | 5,400 | 1,100 | .... | 1,000[3] |
| New Castle, Ind. | 17 | .... | .... | 6,500 | 400 | 400 | .... |
| Dunkirk, N. Y. | 17 | .... | .... | 7,700 | .... | 700 | .... |
| Palo Alto, Calif. | 16 | .... | .... | 4,000 | 1,000 | 600 | 150[3] |
| Frederick, Md. | 16 | 45 | .... | 10,000 | 1,000 | 500 | .... |
| Decatur, Ga. | 16 | .... | .... | 3,150 | 600 | 450 | .... |
| Wallingford, Conn. | 16 | .... | .... | 9,000 | .... | .... | .... |
| Corning, N. Y. | 16 | .... | .... | 6,500 | .... | .... | 400[3] |
| Ecorse, Mich. | 16 | .... | .... | 7,000 | .... | 500 | .... |
| Iowa City, Iowa | 16 | .... | .... | 4,400 | 500 | .... | 600 |
| Morristown, N. J. | 16 | .... | .... | 7,050 | 1,000 | 300 | 250[3] |
| Whittier, Calif. | 16 | .... | .... | 4,000 | 1,000 | 400 | .... |
| Greenfield, Mass. | 15 | .... | .... | 6,000 | 300 | .... | 900[3] |
| Waterville, Me. | 15 | .... | .... | 12,250 | .... | 750 | .... |
| Muskegon Heights, Mich. | 15 | .... | .... | 4,700 | .... | 700 | .... |
| Marquette, Mich. | 15 | .... | .... | 7,000 | 300 | 700 | .... |
| Hastings, Nebr. | 15 | .... | .... | 3,150 | 200 | .... | .... |
| Virginia, Minn. | 15 | .... | .... | 7,000 | 2,000 | 200 | .... |
| Warren, Pa. | 15 | .... | 150 | 6,250 | 400 | .... | 800[3] |
| Redlands, Calif. | 15 | .... | .... | 5,500 | 900 | .... | .... |
| Modesto, Calif. | 15 | .... | .... | 8,000 | 1,000 | 500 | .... |
| Parsons, Kans. | 15 | 600 | .... | 5,000 | 600 | .... | .... |
| Independence, Mo. | 15 | 3,000 | .... | .... | .... | .... | .... |
| Valdosta, Ga. | 15 | .... | .... | 4,800 | 200 | .... | .... |
| Grand Junction, Colo. | 15 | .... | .... | 2,800 | .... | .... | .... |
| Marietta, Ohio | 15 | .... | .... | 2,600 | .... | .... | .... |
| Stevens Point, Wis. | 15 | .... | .... | 5,750 | 500 | 400 | .... |
| Highland Park, Ill. | 15 | .... | .... | 4,100 | 400 | 600 | .... |
| Coatesville, Penn. | 15 | .... | .... | 5,300 | 500 | 1,200 | .... |
| Sumter, S. Car. | 15 | .... | .... | 3,600 | .... | .... | .... |
| Canonsburg, Pa. | 15 | .... | .... | 8,000 | .... | .... | .... |
| Greenville, Miss. | 14 | .... | .... | 7,800 | .... | .... | .... |
| Corsicana, Tex. | 14 | .... | .... | 7,000 | 1,000 | .... | .... |
| Sault Sainte Marie, Mich. | 14 | .... | .... | 4,500 | 200 | .... | .... |
| Nyack, N. Y. | 14 | .... | 50 | 4,500 | 500 | .... | .... |
| Winchester, Va. | 14 | .... | .... | 7,600 | .... | .... | .... |
| Moberly, Mo. | 14 | .... | .... | 3,300 | 600 | .... | .... |
| Mt. Clements, Mich. | 14 | .... | .... | 7,200 | .... | 600 | .... |
| Plattsburg, N. Y. | 14 | .... | .... | 5,000 | .... | .... | .... |
| Traverse City, Mich. | 14 | .... | .... | 5,500 | 200 | .... | .... |
| Arkansas City, Kans. | 14 | .... | .... | 5,000 | .... | .... | .... |
| So. Portland, Me. | 14 | .... | .... | 11,050 | .... | .... | .... |
| Keene, N. H. | 13 | .... | .... | 10,000 | 1,000 | 600 | 600[3] |
| Marinette, Wis. | 13 | .... | .... | 7,000 | .... | .... | .... |
| Ontario, Calif. | 13 | .... | .... | 5,000 | 3,000 | 100 | .... |
| Lewistown, Pa. | 13 | .... | .... | 4,000 | .... | 750 | .... |
| Ridgewood, N. J. | 13 | .... | .... | 4,650 | 500 | .... | 1,000 |
| Corbin, Ky. | 13 | .... | .... | 2,500 | .... | 200 | .... |
| Greeley, Colo. | 13 | .... | .... | 3,000 | 300 | 400 | .... |
| Cleburne, Tex. | 13 | .... | .... | 3,800 | 500 | 500 | .... |
| Oneonta, N. Y. | 13 | .... | .... | 5,000 | .... | 400 | 600[3] |
| Peru, Ind. | 12 | .... | .... | 6,000 | 400 | .... | 600[3] |
| Massena, N. Y. | 12 | 2,300 | .... | .... | .... | .... | .... |
| Willimantic, Conn. | 12 | .... | .... | 6,300 | 1,000 | .... | 1,000[3] |
| St. Augustine, Fla. | 12 | .... | .... | 4,000 | 600 | .... | 450 |
| Bellevue, Pa. | 12 | .... | .... | 2,200 | .... | 300 | .... |
| Logan, Utah | 12 | .... | .... | 7,000 | 1,000 | .... | 800[3] |

## Hose in Service in Some of the Leading American Fire Departments. (Continued)

| City and State | Population in Thousands | 3½" Feet | 3" Feet | 2½" Feet | 1½" Feet | 1" Feet | Other Sizes—Feet |
|---|---|---|---|---|---|---|---|
| Huron So. Dak. | 12 | .... | .... | 5,000 | 500 | 750 | .... |
| Medford, Ore. | 12 | .... | .... | 4,630 | 600 | 400 | .... |
| Idaho Falls, Idaho | 12 | .... | .... | 5,400 | 300 | .... | .... |
| Greenwood, Miss. | 12 | .... | .... | 5,000 | 400 | .... | .... |
| Lawton, Okla. | 12 | .... | .... | 6,500 | 1,000 | .... | 500 |
| Ft. Collins, Colo. | 12 | .... | .... | 5,700 | 700 | 200 | 350 |
| Trinidad, Colo. | 12 | .... | .... | 4,500 | 400 | .... | 650[2] |
| Barre, Vt. | 12 | .... | .... | 5,500 | .... | .... | .... |
| Ventura, Calif. | 12 | .... | .... | 3,500 | 1,000 | .... | .... |
| Helena, Montana | 12 | .... | 300 | 4,150 | 300 | .... | .... |
| Hopkinsville, Ky. | 12 | .... | .... | 3,200 | 300 | .... | .... |
| Fullerton, Calif. | 11 | .... | .... | 4,400 | 1,200 | 350 | .... |
| Seminole, Okla. | 11 | .... | .... | 3,000 | 900 | .... | 400[3] |
| Ames, Iowa | 11 | .... | .... | 5,000 | 500 | .... | .... |
| East Hampton, Mass. | 11 | .... | .... | 5,000 | 2,500 | .... | .... |
| Hopewell, Va. | 11 | .... | .... | 5,050 | .... | 400 | .... |
| Brainerd, Minn. | 11 | .... | .... | 5,000 | .... | 450 | .... |
| Sanford, Fla. | 11 | .... | .... | 6,000 | .... | 400 | 150[3] |
| Latrobe, Pa. | 11 | .... | .... | 3,000 | .... | .... | .... |
| Stoneham, Mass. | 11 | .... | .... | 6,500 | 2,200 | .... | .... |
| Hickory, N. Car. | 10 | .... | .... | 6,250 | .... | .... | .... |
| Shelbyville, Ind. | 10 | .... | .... | 4,000 | 600 | .... | .... |
| Manhattan, Kans. | 10 | .... | .... | 3,150 | 400 | .... | .... |
| Sarasota, Fla. | 10 | .... | .... | 4,600 | 200 | 300 | 400[3] |
| Swampscott, Mass. | 10 | .... | 400 | 4,000 | 800 | 800 | .... |
| Middleboro, Ky. | 10 | .... | .... | 2,800 | .... | .... | .... |
| Herkimer, N. Y. | 10 | .... | .... | 4,300 | 250 | .... | .... |
| Oskaloosa, Iowa | 10 | .... | .... | 4,100 | 500 | 500 | .... |
| Brookfield, Ill. | 10 | .... | .... | 2,800 | 400 | .... | .... |
| Coeur d'Alene, Idaho | 10 | .... | .... | 4,800 | 2,200 | .... | 300[3] |
| Murphysboro, Ill. | 10 | .... | .... | 1,400 | 300 | .... | .... |
| Suffolk, Va. | 10 | .... | 6,600 | .... | .... | .... | .... |
| Eldorado, Kans. | 10 | .... | .... | 4,000 | 300 | 400 | .... |
| Chanute, Kans. | 10 | .... | .... | 3,000 | 800 | 750 | .... |
| Kirkwood, Mo. | 10 | .... | .... | 6,000 | 600 | 700 | .... |
| Reading, Mass. | 10 | .... | .... | 7,500 | 4,500 | 600 | 40[3] |
| El Centro, Calif. | 10 | .... | .... | 5,500 | 600 | .... | .... |
| Marblehead, Mass. | 10 | .... | .... | 6,000 | 1,200 | 800 | .... |
| Redondo Beach, Calif. | 10 | .... | .... | 1,600 | .... | .... | .... |
| Brawley, Calif. | 10 | .... | .... | 4,150 | 800 | 550 | .... |
| Red Wing, Minn. | 10 | .... | .... | 5,750 | 100 | 350 | .... |
| Pulaski, Va. | 10 | .... | .... | 2,100 | .... | .... | .... |
| Terrell, Tex. | 10 | .... | .... | 3,500 | .... | .... | 200[3] |
| Marion, Ill. | 10 | .... | .... | 3,000 | 600 | .... | .... |
| Derby, Conn. | 10 | .... | .... | 3,000 | .... | .... | .... |
| Dalton, Ga. | 10 | .... | .... | 2,500 | .... | .... | 300[2-6] |
| Centralia, Wash. | 10 | .... | .... | 4,150 | 950 | 250 | 250[3] |
| Lansdale, Pa. | 10 | .... | 30 | 2,100 | 400 | .... | 500[3] |
| Bridgewater, Mass. | 9 | .... | .... | 7,000 | 400 | .... | .... |
| Sayre, Pa. | 9 | .... | .... | 3,250 | .... | 750 | .... |
| Marietta, Ga. | 9 | .... | .... | 2,400 | 50 | 250 | .... |
| Hanford, Calif. | 9 | .... | .... | 15,000 | 600 | .... | .... |
| No. Chicago, Ill. | 9 | .... | .... | 2,700 | 150 | .... | .... |
| Troy, Ala. | 9 | .... | .... | 3,750 | .... | .... | 400[3] |
| Ware, Mass. | 9 | .... | .... | 5,500 | 300 | .... | .... |
| Cheviot, Ohio | 9 | .... | .... | 2,300 | .... | 550 | 250[3] |
| Ludlow, Mass. | 8 | .... | .... | 6,000 | 1,000 | .... | .... |
| Middleboro, Mass. | 8 | .... | .... | 5,900 | 1,400 | .... | 1,150[3] |
| Wabash, Ind. | 8 | .... | .... | 2,000 | 100 | 350 | .... |
| Norwich, N. Y. | 8 | .... | .... | 5,200 | 600 | .... | .... |
| W. Monroe, La. | 8 | .... | .... | 3,600 | .... | .... | .... |
| Darien, Conn. | 8 | .... | .... | 3,000 | 350 | .... | .... |
| Ludington, Mich. | 8 | .... | .... | 4,000 | .... | .... | 400[3] |
| Stoughton, Mass. | 8 | .... | .... | 6,150 | 200 | 5,100 | 1,050 |
| Merrill, Wis. | 8 | .... | .... | 5,000 | 400 | .... | .... |
| Washington, C. H. Ohio | 8 | .... | .... | 3,800 | 50 | 150 | .... |
| Belvidere, Ill. | 8 | .... | .... | 3,600 | .... | 400 | .... |
| Kirksville, Mo. | 8 | .... | .... | 2,000 | 300 | .... | .... |
| Wood River, Ill. | 8 | .... | .... | 3,300 | 200 | .... | .... |
| Valparaiso, Ind. | 8 | .... | .... | 2,700 | 400 | .... | .... |
| Stillwater, Minn. | 8 | .... | .... | 4,000 | 500 | 400 | .... |
| Columbus, Nebr. | 8 | .... | .... | 3,800 | .... | 300 | .... |
| Hillsboro, Tex. | 8 | .... | .... | 3,800 | 200 | .... | .... |
| Clinton, Okla. | 8 | .... | .... | 3,400 | 200 | 200 | .... |
| Shrewsbury, Mass. | 8 | .... | .... | 6,000 | 3,000 | .... | .... |
| Orange, Tex. | 8 | .... | .... | 5,000 | 500 | .... | .... |
| Wheaton, Ill. | 8 | .... | .... | 2,150 | 200 | .... | .... |
| Newberry, S. Car. | 8 | .... | .... | .... | .... | .... | .... |
| Benton, Ill. | 8 | .... | .... | .... | 1,100 | 350 | .... |
| Seymour, Conn. | 8 | .... | .... | 3,300 | 300 | 550 | .... |
| Montpelier, Vt. | 8 | .... | .... | 6,000 | 600 | .... | 100[3] |
| Palmerton, Pa. | 8 | .... | .... | 3,000 | 200 | .... | .... |
| Boulder, Colo. | 8 | .... | .... | 6,400 | 1,150 | 750 | .... |
| Edwardsville, Ill. | 7 | .... | .... | 3,400 | 400 | 200 | .... |
| Wellington, Kans. | 7 | .... | .... | 2,000 | .... | 400 | .... |
| Walpole, Mass. | 7 | .... | .... | 7,000 | 1,000 | 3,000 | 1,000[3] |
| Conway, Ark. | 7 | .... | .... | 2,500 | .... | .... | .... |
| Athens, Ohio | 7 | .... | .... | 2,350 | .... | .... | .... |
| Rockville, Conn. | 7 | .... | .... | 6,000 | .... | .... | .... |
| Roseville, Mich. | 7 | .... | .... | 1,800 | .... | 300 | .... |
| Concord, Mass. | 7 | .... | .... | 5,000 | 100 | 3,000 | .... |
| Scotia, N. Y. | 7 | .... | .... | 4,000 | 200 | .... | .... |
| Paulsboro, N. J. | 7 | .... | .... | 4,000 | 150 | 400 | .... |
| New Ulm, Minn. | 7 | .... | .... | 3,400 | 500 | 500 | .... |
| Oldtown, Me. | 7 | .... | .... | 6,000 | 1,500 | .... | .... |
| White-Fish-Bay, Wis. | 7 | .... | .... | 2,400 | 100 | 500 | .... |
| Hudson Falls, N. Y. | 7 | .... | .... | 3,500 | .... | .... | .... |
| Bozeman, Mont. | 7 | .... | .... | 3,000 | 300 | .... | .... |
| Hastings on Hudson, N. Y. | 7 | .... | 50 | 3,400 | 400 | .... | 750[3] |
| Rankin, Pa. | 7 | .... | 1,500 | .... | 100 | .... | .... |
| New Braunfels, Tex. | 7 | .... | .... | 4,500 | 600 | .... | .... |
| Mansfield, Mass. | 7 | .... | .... | 5,500 | 2,250 | .... | 900 |
| Pendelton, Ore. | 7 | .... | .... | 2,800 | 700 | .... | .... |
| Wilmerding, Pa. | 7 | .... | .... | 3,300 | .... | .... | .... |
| McKinney, Tex. | 7 | .... | .... | 4,000 | .... | .... | .... |
| Culver City, Calif. | 7 | .... | .... | 7,000 | 1,000 | 600 | 300 |
| Rocky River, Ohio | 7 | .... | .... | .... | .... | .... | .... |
| Freehold, N. J. | 7 | .... | .... | 3,800 | 1,000 | 400 | .... |
| Nantucket, Mass. | 7 | .... | .... | 8,000 | 300 | .... | 1,000 |
| Millbury, Mass. | 7 | .... | .... | 5,800 | 700 | .... | .... |
| Medina, N. Y. | 7 | .... | .... | 4,000 | .... | .... | .... |
| Lehighton, Pa. | 6 | .... | .... | 3,000 | .... | .... | .... |
| Alliance, Nebr. | 6 | .... | .... | 2,000 | .... | .... | .... |
| Uxbridge, Mass. | 6 | .... | .... | 5,500 | 2,500 | 4,000 | .... |
| Gardiner, Me. | 6 | .... | .... | 6,500 | 500 | .... | .... |
| Newnan, Ga. | 6 | .... | .... | 3,500 | .... | 500 | .... |
| Hingham, Mass. | 6 | .... | .... | 10,000 | .... | 1,000 | .... |
| Franklin, N. H. | 6 | .... | .... | 5,100 | 1,500 | 300 | .... |
| Chester, S. Car. | 6 | .... | .... | 4,000 | .... | .... | .... |
| Cisco, Tex. | 6 | .... | .... | 3,500 | .... | .... | .... |
| Juneau, Alaska | 6 | .... | .... | 5,000 | 1,000 | .... | .... |
| Livingston, Mont. | 6 | .... | .... | 4,000 | 600 | .... | 400[3] |
| Coronado, Calif. | 6 | .... | .... | 3,500 | 500 | .... | .... |
| Grandview Heights, Ohio | 6 | .... | .... | 1,000 | 300 | 200 | .... |
| Spencer, Mass. | 6 | .... | .... | 6,700 | 200 | 700 | .... |
| Falmouth, Mass. | 6 | .... | .... | 6,000 | 2,000 | 3,500 | 900 |
| Raton, New Mex. | 6 | .... | .... | 3,000 | .... | .... | .... |
| Dallas, Ore. | 6 | .... | .... | 3,650 | 450 | .... | 400 |
| Manistique, Mich. | 6 | .... | .... | 5,000 | .... | .... | 600[3] |
| Gettysburg, Pa. | 6 | .... | .... | .... | .... | .... | .... |
| Pratt, Kans. | 6 | .... | .... | 2,000 | 400 | .... | 200[5] |
| Westminister, Md. | 6 | .... | .... | 3,500 | .... | 300 | 200[8] |
| Hancock, Mich. | 6 | .... | .... | 4,000 | .... | .... | .... |
| Ford City, Pa. | 6 | .... | .... | .... | .... | .... | .... |
| Staunton, Ill. | 6 | .... | .... | 1,000 | .... | .... | .... |
| Canon City, Colo. | 6 | .... | .... | 2,200 | 400 | 200 | 100[3] |

[1]4 in. hose; [2]2½ in.; [3]¾ in.; [4]¼ in.; [5]1¾ in.; [6]1¼ in.; [7]⅝ in.; [8]2 in.; [9]1⅛ in.

# Detroit Department Keeps Ahead

## First Large Fire Department to Install Closed Body Pumpers—Many Other "Firsts" to Its Credit

THIS month the Fire Department of the city of Detroit celebrated the delivery of four new sedan type pumpers, built by the Seagrave Corporation, Columbus, Ohio, from designs worked out jointly by the company and by the Mechanical Division of the Detroit Fire Department. In these new machines all equipment, suction hose, ladders, etc., are inside the body. A seat the length of the body is provided for the men, with entrance at the rear, and exit at the front. These sedan pumpers can carry more hose than the open types of machines.

### Detroit First in Many Improvements

According to Chief Walter Israel and Chief of Apparatus Edward Rumsey, the Detroit department, the first large department to adopt the closed body pumper, was also the first to adopt pneumatic tires, shaft driven axles and four-wheel brakes.

It was also the first Fire Department to make it possible for an engineer to put proper pump pressure on the engine by estimating the amount of pressure loss in the line.

When it first adopted pneumatic tires, the Detroit Fire Department was criticized by many in the fire service, on the ground that these tires would blow out and cause serious accidents. Up to date the department has never had an accident due to pneumatic tire failure.

The Fire Commissioners of the city of Detroit, in approving the purchase of closed body apparatus, were convinced that it will add greatly to the efficiency of the men and cut down the number of men away on sick leave. Furthermore, it reduces the risk of men falling from or being knocked off the running boards while going to or returning from a fire.

### The Detroit Fire Department

Today, the Detroit Fire Department has a total membership of 1,820, of which 1,570 are firemen. There are 98 companies located in 67 stations.

Over 3,000 fire alarm boxes are placed at strategic points throughout this city of a million and a half population.

Unlike many other cities today, Detroit has not cut her Fire Department budget. The budget for 1935 was $4,733,351, and for 1936 amounts to $5,052,201. The 1935 budget covered a period of from July 1, 1935, to July 1, 1936, and the 1936 budget covers July 1, 1936, to July 1, 1937.

### Adopt Radio Equipment

The department was prompt to utilize radio equipment, and today the Chief's car, his two assistants' cars, the ambulance and two fire boats are all equipped with radio. The Fire Department maintains its own radio transmitter. The present equipment of the department includes two pumpers of less than 500 gallons capacity, fifty-eight of from 500 to 1,000 gallons capacity, two fire boats, seven combination chemical and hose cars, ten city service trucks, nineteen aerial trucks, four hose cars, thirty-two chiefs' cars, four rescue cars, with one in reserve, one gasoline supply truck of 500 gallons capacity and one wrecker.

### Will Replace Old Apparatus

While a great deal of the apparatus in the department is over ten years old, the department plans to replace these as rapidly as they become obsolete and as funds become available. This year, four pumpers are being replaced by the new closed body pumpers, and two aerial trucks and nine chiefs' cars will be supplanted by new ones.

Hose in service includes 740 feet of 3½-inch, 30,450 feet of 3-inch, 111,900 feet of 2½-inch, 200 feet of 1½-inch, 15,850 feet of one-inch and 2,380 feet of other sizes.

The policy of the department is to replace the hose when test and inspection indicates the desirability thereof. Tests, in the case of 2½-inch hose, are conducted yearly and

Geo. W. Trendle, President
Fire Commission, Detroit.

Arthur W. Winter,
Vice-President,
Fire Commission, Detroit.

C. Hayward Murphy,
Commissioner, Detroit.

One of the New Closed Body Pumpers of the Detroit Fire Department

the hose is submitted to 240 pounds pressure.

Chief Israel and Chief of Apparatus Rumsey are of the belief that future improvements in motor fire apparatus, in addition to the closed body, will include shorter wheel bases for trucks, shorter overall length, general construction lighter, three-section metal aerial and also three-section metal ground extension ladders, multiple cylinder engines direct connected to centrifugal fire pump and stronger and lighter hose.

### Fire Headquarters an Unusual Building

The Detroit Fire Headquarters is quite an unusual building, of six stories in height, built in 1929. The offices therein are elaborately furnished and on the top floor is a large auditorium where departmental school classes are conducted.

The drill school has been doing splendid work in training the force in modern methods in fire fighting, use of tools and apparatus, etc.

The Board of Fire Commissioners of the Detroit Department include George W. Trendle, President; Arthur W. Winter, Vice-President; Nate S. Shapero and C. Hayward Murphy, all business men who serve without compensation. Walter F. Israel, the Chief, is a progressive officer, who has been quick to adopt new innovations in his department when they show merit. Responsibility of keeping apparatus in shape rests on the shoulders of Chief of Apparatus Edward C. Rumsey.

## Tennessee Firemen Meet at Memphis

The sixth annual convention of the Tennessee Firemen's Association was held at Memphis, Tenn., June 17 to 19, with about 325 persons present. The following talks were given:

"Value of Short Course Fire School by Vocational Department University of Tennessee," Capt. E. T. Holman, Tennessee Inspection Bureau, Nashville.

"Industrial Hazards," E. B. Hanson, assistant State Fire Marshal, Memphis.

"The Necessity of Training for Volunteer Firemen and Volunteer Fire Fighting," Chief K. K. Eslick, Fayetteville, Tenn.

"Arson and the Means of Combating Same; Necessity of First Company on Scene Preserving Evidence of Suspicious Fires," L. H. Harber, Special Agent, National Board of Fire Underwriters, Memphis.

"Traffic Conditions and Auto Parking as Affecting Fire Department Operations," Frank Buckalew, City Fire Marshal, Memphis.

"Responsibility and Relationship of Water, Police, and Fire Departments," Hon. Thomas H. Allen, Memphis.

"Cooperation Between Fire Departments and the Inspection Bureau," A. J. Wilds, Manager, Tennessee, Inspection Bureau, Memphis.

"The Practical Handling of Fire Streams," Clarence Goldsmith, Assistant Chief Engineer, National Board of Fire Underwriters, Chicago.

"Benefits Derived from Attending the Firemen's Annual Convention," Joe J. Martin, Secretary, Nashville.

"Gas Masks, Gases, Etc., F. A. King. Mine Safety Appliance Company, Pittsburgh, Pa.

During the convention there were demonstrations at the drill tower.

The officers are Capt. B. S. Mattingly, President, Nashville; Asst. Chief W. J. Sams, Executive Vice-President, Knoxville; Chief Irby M. Klinck, Vice-President, Memphis; Chief L. L. Geisler, Vice-President, Johnson City; Joe J. Martin, Secretary, Nashville; W. D. Rogers, Historian, Nashville. The next convention will be held at Springfield.

## Elmira Heights to be Host

The second annual convention of the New York and Pennsylvania Firemen's Association will be held at Elmira Heights, N. Y., August 27 and 28. On the first day will be held the business meeting, election of officers, and banquet in the evening. The second day will be devoted to contests and a parade.

The association is composed of twenty-five companies of departments in the counties of Chemung and Steuben in New York, and Potter and Tioga in Pennsylvania.

## New Mexico Firemen Hold School

Twenty-nine Fire Departments were represented at the fire school and convention of the New Mexico State Firemen's Association. During one evening a demonstration witnessed by more than 3,000 people, was staged by the Albuquerque Fire Department.

The new officers are H. J. Mendenhall, Santa Fe, President; S. E. Brentari, Gallup, First Vice-President; J. B. Fish, Estancia, Second Vice-President; J. E. Wickham, Albuquerque, Third Vice-President; T. A. Rosenwald, Albuquerque, Secretary-Treasurer.

The 1937 convention will be held at Clayton at a date to be selected.

Walter F. Israel,
Chief, Detroit Fire Department

Nate S. Shapero,
Fire Commissioner, Detroit

Edward C. Rumsey,
Chief of Apparatus and High Pressure

# What Improvements in Apparatus Do Fire Chiefs Want?

## Four Hundred Fire Department Heads Suggest Changes Which They Consider Most Essential

IN answer to the question, "What, in your opinion, is the most needed improvement in fire apparatus design?" approximately four hundred Fire Chiefs offered their recommendations, which are summed up in the table herewith.

Probably the most interesting disclosure is the number who feel that closed bodies on fire trucks are the most essential improvement to be made in apparatus. Out of the 400 who answered the question, 112 considered closed bodies of first importance.

Thirty believed that cabs to enclose the drivers and officers, or the drivers and some of the men, would answer the need. Seven others felt that better protection for the men riding on apparatus was essential, but did not suggest the manner in which such improved protection might be obtained.

As might be expected, quite a large number saw the need for four wheel brakes on fire apparatus.

There seems also to be a growing feeling in fire service that a shorter wheel base and less overall length is necessary in present day fire apparatus; also better ability to maneuver in cramped spaces.

Booster tanks of larger capacity were considered most essential by seventeen Chiefs, while eleven felt that all triple combination cars should carry booster tanks.

An analysis of the comments on ladder trucks would indicate that the all-metal, power raised aerial ladders are here to stay. Some felt that ladders should be longer than at present, preferably 100 feet, and several preferred the three-section rather than the two-section ladders.

So mounting of portable ladders on ladder trucks that they might be taken off the side of the ladder truck was recommended by two Chiefs, while one suggested the development of three section metal ground extension ladders.

Many suggestions were made regarding the equipment and design of pumpers. The use of multiple cylinder engines direct connected to centrifugal pumps; smaller trucks built along plans similar to larger pumpers for answering suburban runs; pumps so designed that discharge ports are brought to rear of the apparatus; the use of diesel engines for pumping units, and swivel connections to facilitate quick hook-up were some of the recommendations.

One Chief made the novel suggestion that pumpers be equipped with removable hose beds to facilitate loading the extra shift of hose on the truck upon return from the fire.

Of course, many felt that such improvements should be made to apparatus as to bring its cost down, though no concrete ideas were advanced as to how this might be accomplished.

The suggestions in the table afford food for thought, and it is possible that some of them may eventually find their way into general use.

| Suggested Improvements | Number Recommending Improvement |
|---|---|
| Enclosed bodies | 112 |
| Enclosed cabs on apparatus | 30 |
| Better protection for men on apparatus | 7 |
| Windshields (front) | 19 |
| Windshields for tillerman | 2 |
| Four wheel brakes | 39 |
| Enclosed compartments for carrying minor equipment | 5 |
| Lighter weight of apparatus | 12 |
| Shorter wheel-base and less overall length of apparatus | 11 |
| Lower bodies—lower center of gravity | 4 |
| Pneumatic tires | 4 |
| Dual pneumatic tires on rear end | 3 |
| Larger booster tanks | 17 |
| 500 gallon booster tanks for volunteer Fire Departments | 2 |
| All triple combination cars to carry booster tanks | 11 |
| Light and fast pumpers equipped with booster tanks | 1 |
| More power and less speed in pumpers | 2 |
| More power and greater capacity | 1 |
| Lower cost equipment for cities with small budgets | 2 |
| Two-way radio for chiefs' cars | 2 |
| One-way radio | 1 |
| Radio for all trucks and chiefs' cars with connection from headquarters to keep in touch with crews at fires | 1 |
| Simpler control for pumpers and other apparatus | 6 |
| Smaller apparatus | 5 |
| Multiple cylinder engines direct connected to centrifugal pump | 1 |
| Smaller truck built on plans similar to larger pumps to answer suburban runs | 1 |
| Pumps so designed that discharge ports are brought to rear of apparatus to hose box to avoid man who breaks hose coupling running around to front of pumper | 1 |
| Connected small lines—1 and 1½" (in design of new apparatus 2-1½" lines are carried directly connected to pump) | 1 |
| Pumping engine designed so as not to carry hose | 1 |
| Diesel engine for pumping units | 1 |
| Good reliable relief valves on pumps | 1 |
| Suction connections at the front and side | 1 |
| Swivel suction connections for quick hook-up | 1 |
| **Ladders** | |
| Power operated aerial ladders | 3 |
| 3-section metal aerial ladder | 1 |
| All-metal aerial with longer ladders | 24 |
| Small 50-foot combination aerial truck and water tower for small cities, to be operated by 1 man | 1 |
| Small aerial trucks, power operated, for towns | 2 |
| Aerial trucks with longer ladders | 2 |
| Side take-off for ladders on ladder trucks | 2 |
| Lighter and stronger ladders | 1 |
| 3-section metal ground extension ladder | 1 |
| **Miscellaneous** | |
| Longer trucks with hose beds of 12 to 14 feet | 1 |
| Larger hose bodies | 1 |
| Removable hose beds for providing new load of hose upon return from fire | 1 |
| Use of 1½-inch hose on all apparatus, especially in smaller towns | 1 |
| Improvement in design of hard suction hose | 1 |
| Large capacity of hose bodies | 1 |
| Standardize on suction and manifold sizes, tools and equipment | 1 |
| Chief's car with booster tanks | 1 |
| Revising location of equipment on apparatus to afford greater safety for men | 1 |
| Uniform mounting of implements | 1 |
| Places to store and carry salvage tools and covers on engines | 1 |
| All combination chemical and hose trucks should be equipped with deck guns | 1 |
| Chemicals to combat every kind and size of fire should be carried | 1 |
| Fog nozzle on apparatus for use in fighting oil fires, attic and cellar fires | 1 |
| Electric equipment to keep the motors warm for easy starting and in good running condition in winter | 1 |

| | |
|---|---|
| Relocating the motor so that the distance between the driver and the radiator would be shortened to afford clear vision of the road | 1 |
| Generator large enough to supply at least two 250-watt portable lights | 1 |
| | 1 |
| Plenty of road clearance | 1 |
| Dual drive wheel | 1 |
| Improvement in ability to navigate in difficult places | 1 |
| More stream lining of apparatus | 2 |
| Simplify design of apparatus to combine standard construction but at lower cost | 1 |
| Easier riding springs | 1 |
| Two way telephone arrangement between interior of buildings and chief's car, or outside point (portable and probably on loud speaker set up). A microphone for chief to instruct different units from central point | 1 |
| Warning signal from tillerman to driver | 1 |
| More compact portable lighting equipment | 1 |

## A Visual Way of Showing Home Hazards

Much has been written regarding the value of visual education. In line with the new method of instruction, Chief George Haggerty, Berkeley, Cal., distributed 25,000 folders showing by means of a cross section of an average home, the fire hazards that commonly exist. These folders were also distributed in San Francisco.

Chief Haggerty believes that this folder has brought about better results than any other thing used. As a result of this folder, the Garbage Department of the city was swamped with calls to remove rubbish, and the Fire Prevention Bureau received a number of calls for information, and for inspections.

Boy Scouts distributed 5,000 blotters to all mercantile establishments and manufacturing concerns.

The illustration, which is reproduced appears across the two inside pages of the folder, and on the last page is a list of the fire alarm box numbers and locations.

## Many Departments Deficient in Hose

(*Continued from page* 308)

vice in cities throughout the country is given. Lack of space prohibits the publication of the reports of all cities submitted, but the summary herewith entitled "Record of Hose in Service in Approximately 600 Cities, with a Total Population of Over 28,000,000," includes totals of figures from all cities reporting.

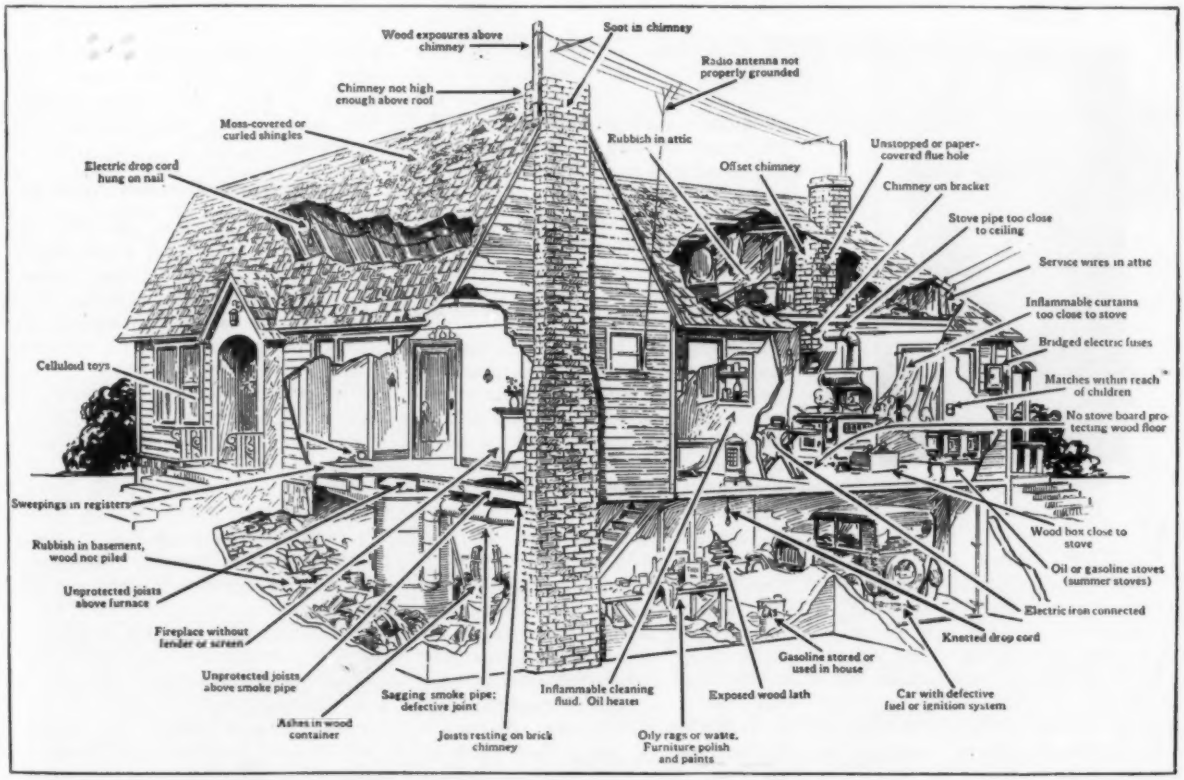
A study of these figures brings to light some interesting facts, particularly with regard to the increasing use of small diameter hose, the amount of hose which is in service which is five or more years old, and the amount of hose which should be replaced.

One thing is certain and that is that Fire Departments are getting by today with far less hose than good judgment demands. More severe annual, semi-annually or quarterly tests would show the weaknesses in the hose supply and would result in replacement of that which is unsafe.

A sound and sensible policy would be to discard all hose which has served beyond its useful life, replacing such with new hose, and to establish a plan for annual replacement of a certain amount of the hose at present in service. Such a system would insure keeping this vital feature of the department in condition to meet any emergency.

**Seaside Heights, N. J.**, has received a Pirsch-Ford 500-gallon triple combination pumper which it purchased through the New Jersey Fire Equipment Company, Dunellen, N. J.

**Eugene McAnney,** Chief, Conovertown, N. J., died in the Atlantic City Hospital as the result of a crash while driving fire apparatus from Absecon Highlands. The truck upset on a slippery street. Chief McAnney was fifty-three years old.


Wood exposures above chimney
Soot in chimney
Radio antenna not properly grounded
Chimney not high enough above roof
Moss-covered or curled shingles
Rubbish in attic
Unstopped or paper-covered flue hole
Electric drop cord hung on nail
Offset chimney
Chimney on bracket
Stove pipe too close to ceiling
Service wires in attic
Inflammable curtains too close to stove
Bridged electric fuses
Celluloid toys
Matches within reach of children
No stove board protecting wood floor
Sweepings in registers
Wood box close to stove
Rubbish in basement, wood not piled
Oil or gasoline stoves (summer stoves)
Unprotected joists above furnace
Electric iron connected
Knotted drop cord
Fireplace without fender or screen
Gasoline stored or used in house
Unprotected joists above smoke pipe
Inflammable cleaning fluid. Oil heater
Exposed wood lath
Car with defective fuel or ignition system
Sagging smoke pipe; defective joint
Ashes in wood container
Joists resting on brick chimney
Oily rags or waste. Furniture polish and paints

"Is This a Sketch of Your Home?" an Illustration Which Has Brought Good Results to Berkeley, Cal.

The Author Using Hand Microphone. The Amplifiers Are Seen at Rear of Truck

# Amplifying the Voice of Authority

## Loud Speakers Installed on Salvage Trucks Enable Jersey City Fire Officers to Make Themselves Heard Over All Noise at Fires

By THOMAS J. WOLFE

Director of Public Safety, Jersey City, N. J.

Thomas J. Wolfe

WALKING down the principal thoroughfare of a city in which I was visiting, my attention was attracted to the clamor of the fire apparatus as the engines responded to an alarm. Quite naturally, because of my official interest in such things, and because the source of the alarm seemed to be in the vicinity, I sauntered in that direction.

The fire was in a three-story office building and had gained considerable headway before the fire fighters reached the scene. The firemen were very prompt and efficient and had lost no time in "lining in." A truck company had already placed its ladders and several firemen were on the roof of the burning building. Presuming upon my official position, I was permitted inside the fire lines to watch the operations.

### Chief's Voice Unheard, Because of Din

A Battalion Chief standing nearby, studying the situation with practiced eye and determining the most effective method to control the fire, having suddenly made up his mind, cupped his hands to his mouth and bawled stentorious orders to the firemen three stories above.

Although the Chief was the possessor of a robust voice, even I, standing not so many feet away from him, had difficulty in determining just what he was saying. This was easily understood because the clamor was terrific; the noise of arriving apparatus and the shouts of spectators and firemen adding to the din. As for the firemen on the roof, they paid no heed for the very obvious reason that they had heard not one word of the shouted instructions of the Chief, who was finally forced to send another fireman aloft to repeat the original orders. Not a little valuable time was lost as the result of this maneuver.

### Peril of Firemen Narrowly Averted

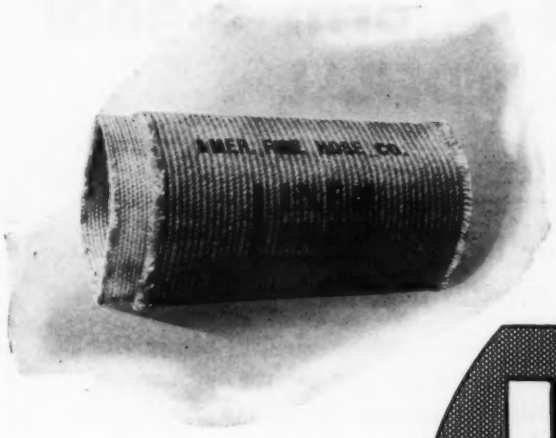
As I stood watching the fire, my mind went in retrospect a number of years to the time when I was a police official and my official position as a precinct commander demanded my attendance at a three-alarm conflagration.

The firemen were having a difficult time of it and gases generated by the flames were taking their toil in reddened eyes and tortured lungs.

At a critical period in the battle, one of the walls of the burning building revealed a very ominous crack, of which firemen manning a hose nozzle on an adjacent roof were in total ignorance.

The officer in command shouted at the top of his lungs to apprise them of their peril and ordered them to a safer location, but although the imperilled firemen heard his shouts, their import was not intelligible to them. One moved close to the end of the roof and listened intently, but a gesture of lack of understanding was

# Modern Hose for Modern Needs

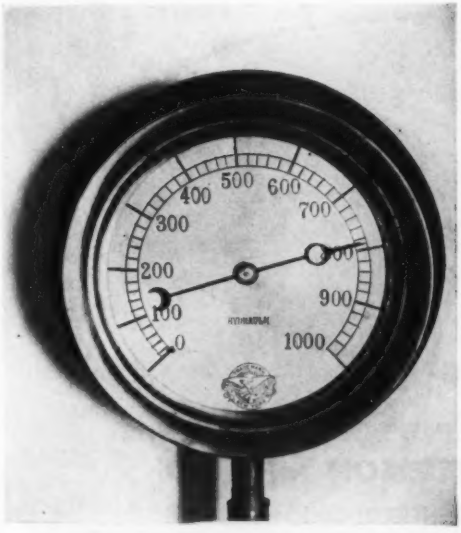



Above photo shows the construction of LINEN-LINED Hose — outer jacket of specially woven cotton and inner jacket of best grade long-fibered linen, both thoroughly mildew-proofed. Made in 3-inch diameter with 2½-inch couplings.

*less weight—*
*greater strength—*
*greater durability—*
*greater flexibility—*

**LINEN LINED FIRE HOSE**

Below — the unusual strength of LINEN-LINED Hose is indicated by the actual photo of gauge attached to a length under test, showing practically 800 lbs. pressure.




MARKING the first outstanding advance in hose construction that the fire fighting world has seen since the advent of motor apparatus, LINEN-LINED Hose has been enthusiastically received by progressive fire chiefs everywhere. Rigid tests and demonstrations, conducted under the close supervision and critical eyes of seasoned fire-fighting experts, have easily proven beyond every doubt the all-around superiority of LINEN-LINED Hose.

If you believe in keeping abreast of the times, you ought to familiarize yourself with LINEN-LINED. It's the hose you will eventually use.

*Write for descriptive literature. If you plan to attend the I.A.F.C. Convention at Toronto, see our demonstration.*

**AMERICAN FIRE HOSE COMPANY**

**1500 Walnut Street, Philadelphia, Pa.**

**Factory—South and 5th Streets, Passaic, N. J.**

Phone Passaic 2-2569

INSTALLATION OF DUPLEX AIR WHISTLES ON STREET AT FRANKLIN SQUARE, LONG ISLAND, NEW YORK.

*A Radically New*

**Fire Alarm Signal**

**The FEDERAL**

*Electric-Air Whistle*

*A Far Reaching Air Whistle that creates its own air supply.*

● This new signalling device comprises a complete air plant and whistle in one unit. Will code on 1 second timing, and connect into your existing system.

Made in FIVE sizes.

*Write for Bulletin 51*

*A SIGNAL FOR EVERY PURPOSE*

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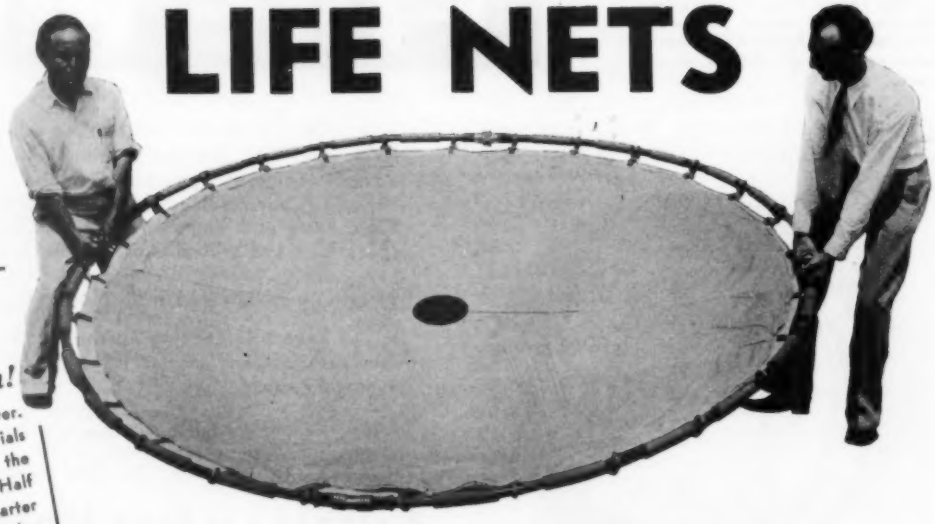
*Perform Daring Rescues With Dependable*

**BROWDER LIFE NETS**



*The Most Popular Life Net in America!*

And in use the world over. Made of the best materials obtainable and with the utmost care. Two types: Half folding for aerials, quarter folding for other trucks. Last for years with ordinary care. Your favorite dealer sells them—your neighbor uses them.

*Complete Information and Prices from*

**CORY-PATTERSON MFG. CO.**

GREENFIELD, OHIO

proof positive that the frenzied shouts of the Chief were not understood.

Fortunately, the imperilled firemen were notified of their danger in sufficient time to make a safe, if rather precipitous retreat. The retirement from their untenable position was none too soon, for hardly five minutes had elapsed before the weakened mass of brick toppled with a resounding crash.

### How Surmount This Difficulty?

It occurred to me as I stood watching this fire in a strange city and thinking of a fire of many years before in Jersey City, that something might be done to make more intelligible the orders issued by the commanding officer and which could be heard above the ordinary clamor at the scene of a blaze.

As I stood there thinking, a picture of the gaping amplifier on the roof of the "Voice of Safety" car, used in the dissemination of safety propaganda in Jersey City, flashed through my mind.

"The voice of the operator of this car can be heard very clearly over a radius of two or three blocks," thought I, "there is no reason why amplifying units attached to fire apparatus could not be heard very clearly above the din incident to a fire and, in addition, firemen, or other persons for that matter who might be imperilled, could be given instructions as to just what to do in cases of extremity."

After all, the adoption of such a system would be merely a mechanization of the trumpets used by fire officers of another era in giving instructions at a fire, except that the sound of the voice issuing from the trumpet would be intensified a thousand times.

When I returned to Jersey City this problem was still in my mind and I lost no time in visiting Deputy Chief Myles Burke, in our Fire Department Repair Shops.

Deputy Chief Burke has done a very remarkable work in the operation of this very important unit of the department and the fire apparatus manufactured in the shops has been the source of much favorable comment from keen students of the art of fire fighting.

### Install Amplifier on Salvage Truck

As always, Deputy Chief Burke was very receptive to my idea and suggested that a trial could be made by placing an amplifying device on a salvage truck, the manufacture of which had just been completed in the shops.

"The reason I suggest the installation of this amplifying device on this and the other salvage trucks of the department is that at least one of these units responds to every alarm of fire," the Deputy Chief told me, "and because of this fact, this loud speaking equipment would be on the scene of any blaze, ready for service on every necessary occasion. Every fireman working at a fire would recognize the distinctively amplified voice, would listen as a matter of habit, and would be responsive to any suggestions or orders." To which sound advice I could do nothing else but agree.

### Salvage Truck Described

A description of one of the salvage trucks of the Jersey City Fire Department is pertinent.

The sides of the truck are constructed in the form of closets, measuring about three feet high, two feet wide and running the length of the vehicle. The closets are made into sections, in order to store the equipment carried by vehicles of this nature. The space between the closets is used to carry hose and other equipment.

It was decided, after our conference, to place two loudspeakers on the rear of the top of the closets. These speakers were connected with the amplifying set, which was installed in a section of the closet on the right side, just back of the driver's seat. The opening of a small door made the hand microphone, which was extended on a twenty-foot cable, easily accessible, the loud speakers were so constructed that the horns could be raised or lowered. In addition, the stands upon which the speakers were mounted could be swung from side to side.

### Tests Prove Practicability of Device

Tests made since the installation of the amplifying system on the salvage trucks have justified my confidence in its practicability and there is no doubt but that the transmission of orders in this manner will greatly facilitate fire operations; especially if the fire is a dangerous one and much noise and confusion are present.

So far as I know Jersey City is the first community to adopt this system of amplification in fighting fires, but there are so many obvious advantages in connection with its use that I am confident that the time is not far distant when it will be generally adopted by fire-fighting organizations.

## Edward J. Worth, Retired Chief, Dead

Deputy Chief Edward J. Worth, in command of the Marine Division of the New York Fire Department until he retired in 1929, died at a hospital in Queens (Brooklyn) at the age of seventy-four. He was in charge of the fire boat fleet during the trying period of the World War, and he was proud of the record that he never lost a ship. In the war period, he battled against more than three hundred waterfront fires.

Chief Worth was born in the Greenwich Village section of New York City on December 23, 1861. While very young he went to sea and became an abled bodied seaman. In quest for greater thrills he joined the Fire Department. From December 1, 1888, until 1911 he was on shore duty. In 1915 he was given command of the Marine Division.

Known as "Admiral" of the city's fire-fighting fleet, he had an interesting

The Late Edward J. Worth

record. To the department members he was "Smiling Eddie." He was one of the survivors of the Black Tom docks explosion in the Communipaw section of Jersey City that killed two persons and caused $22,000,000 damage.

Chief Worth was cited for heroism three times in 1913; he won the Department Medal for heroism at a pier fire; in 1904, when he was a Captain, he received the Stephenson Medal for the best disciplined company.

His wife died several years ago. He had no children.

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## West Virginia to Hold Fire Extension School

The sixth annual Fire Service Extension School is to be held in the Chemistry Building of the West Virginia University, Morgantown, W. Va., on July 27 to 30. It will be under the auspices of the West Virginia University, the State Fire Marshal of West Virginia, the West Virginia Inspection Bureau, the State Fire Chiefs' and Firemen's Associations and the Central West Virginia Firemen's Association. An instructive program of lectures and evolutions has been arranged.

# PROMOTIONAL STUDY COURSE

**Herein is presented a series of definitions, questions and answers designed to aid fire department officers in preparing themselves for promotional examinations. In this department, which appears monthly, will be included questions typical of examinations held throughout the country.**

## Definitions

Pumper (also called "pumping engine"): Motor fire truck carrying pump, and usually a supply of hose. (When truck is not equipped to carry hose it is usually called a "straight pumper").

Hose Wagon (also called "hose truck"): Fire truck carrying hose.

Combination Chemical and Hose Wagon: Fire truck carrying chemical tanks with chemical hose, and a supply of water hose.

Water Tower: Fire apparatus carrying water mast with nozzle for operating on high fires. Mast usually extends to a height of 65 feet. Deck gun is also provided on this piece of apparatus.

## Questions

**(To be answered in next issue.)**

1. What is the meaning of each of the following terms when used in connection with oils, etc.: (A) volatile, inflammable liquid; (B) flash point; (C) fire test.
   Name five volatile, inflammable liquids.
2. Assume a 4-story factory building, slow burning mill construction used for wood and metal working in which 200 persons are employed:
   (a) What are the fire hazards in such a plant?
   (b) What auxiliary fire appliances should be installed?
   (c) Explain in detail how the lives of the employees should be safeguarded.
3. When a person jumps into a life net there is possibility of injury. How would such injury likely be caused?

## False and True Questions

**(Is each statement false or true? Answers next issue.)**

4. T F—Quick closing of hydrants and nozzles is liable to cause water hammer in the hose line, hydrant or water main.
5. T F—A conflagration hazard is an exposure hazard considered from the standpoint of a large group of buildings.
6. T F—The pressure on a line reaches the highest point when the nozzle is closed gradually.
7. T F—The water tower can be efficiently used for throwing a water curtain between buildings.
8. T F—Sudden shutting off of nozzle, especially on short lines, may cause serious damage even back through the pump as far as the water main (where centrifugal pump is used).
9. T F—Exposure hazard is the danger of one building becoming ignited by fire burning in an adjoining or neighboring structure.
10. T F—Two one-inch nozzles are the equivalent of a two-inch nozzle under identical conditions.
11. T F—Unprotected vertical openings are among the greatest causes contributing to the loss of life and property from fire.
12. T F—The area and capacity of a nozzle is increased by three if its diameter is doubled.
13. T F—Fire doors are sometimes found to be off their tracks, or are not equipped with the necessary fusible link.
14. T F—Plate glass is a better fire retardant than is ordinary wired glass.
15. T F—Some materials have a tendency to add excess weight to floors when fire involving them is being extinguished.
16. T F—A two-inch stream from a 300-gallon pump is of little value in fire fighting.
17. T F—Streams from water towers can be used with effect as high as the eighth floor.
18. T F—Distance between ceiling and top of goods stored is of no importance when building is properly equipped with sprinklers.
19. T F—Fire streams using nozzle tips of greater diameter than 1¼-inch and discharging water at a greater pressure than 90 lbs. per sq. inch are not considered safe to handle without special appliances or without anchoring.
20. T F—A 1⅜-inch nozzle is the approximate equivalent of two one-inch nozzles.
21. T F—Fire walls always extend from the bottom to the extreme top of the building.

## Completion Statements

22. Members of the Fire Department are forbidden to contract debts which .....
23. When an engine company is laying hose in toward a fire, the hose should be laid on the ..... side of the street.
24. When holding Browder life net for persons jumping at a fire the net should be held with hands .....
25. Should damage result through a fireman carrying out improper orders given him by a superior officer the ..... is held responsible.
26. If it is necessary to couple a line of 2½-inch hose to a 3-inch siamese connection on a standpipe a (an) ..... is used.

## Answers to Questions in Previous Issue

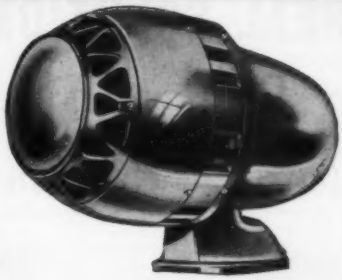
1. In a three stage centrifugal pump water is drawn into the first stage where its pressure is boosted a predetermined amount (for a certain pump speed). From this stage the water enters the second stage under the pressure created in the first stage. In the second stage the pressure is again boosted, usually the same amount as in the first stage, and leaves the second stage to enter the third with the sum of the pressures created in the first and second. In the third stage the pressure is again boosted and leaves the third stage to pass out of the discharge at a pressure approximately equal to the sum of the pressures created in the three stages. Pressure in a centrifugal pump is produced by the employment of centrifugal force. In other words the rotating of the pump impeller throws the water outward and the velocity given it is converted into pressure. This same action takes place in each of the three stages.

The advantages claimed for a centrifugal pump, such as is used on fire apparatus, are: minimum of vibration; maximum of discharge at moderate pressures; simple in operation, which makes possible the shutting off of any or all lines fed by the centrifugal pump, without imposing a strain upon the pump. Thus, when a pumper is operating at a fire, a line may be shut off and still the pump will continue to turn over until the line is again opened up, when the water is immediately supplied under pressure. No pressure relief valves are needed on a centrifugal pump, such as are required on positive displacement pumps (piston and rotary gear).

2. (a) Open the circuit of which this wire is a part. This may be done in an industrial plant by pulling a switch, located on the floor, serving the wire. In other buildings, if separate switches are not provided for the different sections of the building, the main switch located near the meter may be pulled. Immediately after the switch is pulled, the fire can be quickly extinguished with water, chemical extinguishers, etc. In the event that the wire cannot be "killed," then it is necessary to use carbon tetrachloride extinguishers, carbon dioxide extinguishers or other non-conducting extinguishing agents. No harm can be done to the operators thereof, as long as they do not come into physical contact with the wire. Sand might be used for extinguishing the fire on live electric wires, but due to the fact that it is not often available, and is hard to direct upon a small object like a burning wire, it would not prove as effective as the extinguishers. Wire may be cut if properly insulated wire cutters are at hand.

(b) The chief precaution here is to prevent breakage of the plate glass window. Usually the awning frame is held up by the awning itself, and when the awning burns away, the frame will fall. In this case there is danger of the plate glass window being broken. Such an accident can be prevented by using a six foot hook to hold the frame out, until the fire has been extinguished with chemical extinguishers or small water stream. If the awning has been burning in such a position as to heat plate glass window in that immediate neighborhood, care should be taken not to let the water strike the window, for cracking of the window may thereby result.

(c) Use foam extinguisher for extinguishing fire. Large size carbon tetrachloride extinguisher may be used with effect, but it is not as certain in its operation as foam. Dry powder propelled by inert gas may also be used. Stretch in water lines at once, as a precautionary measure, and have them charged. Ventilate thoroughly. Do not use water on the fire in the tub of gaso-



Pat. Pending

## C-5 COASTER SIREN

SPECIFICATIONS

Federal C-5 Coaster Sirens

| | |
|---|---|
| Model | C-5 |
| Finish | Chrome |
| Voltage | 6 or 12 |
| Dimensions | 15" long, 9" high |
| Net weight | 29 lbs. |
| Brackets | Bar or Pedestal |

*(Either Red or Green Lights Available)*

•

**ELECTRIC BRAKE FEATURE**

The Electric Brake is an added feature applied to the C-5 Coaster. The application of the electric brake by the simple touch of a button will instantly silence the roar of this siren when in a zone of quiet. ***Coasts*** for more than ***120 seconds*** after current is off . . . that saves the battery.

**DOUBLE ACTION**

# SIRENS

***STREAMLINED***

**WITH FLASHING LIGHT AND A NEW TONE ROAR**

**CONSIDER THESE FEATURES:**

- Streamlined beauty combined with rugged construction durability.
- A Siren Roar combined with Flashing Rays of Light.
- Greased sealed ball bearings aid ease of operation.
- Flashing light can be operated with siren roar or independently.
- Fully chrome plated.
- Loudest by test . . . brightest warning light.

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*The sweetness of low price never equals the bitterness of poor quality. Demand the Best. Specify a Federal Siren on your new equipment. Accept no substitutes.*

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***ORDER A MODERN SIREN TODAY***

## FEDERAL ELECTRIC CO.

**8702 SOUTH STATE ST. - CHICAGO, ILL.**

## TRAFFIC MASTER

SPECIFICATIONS

| | |
|---|---|
| Model | "W" |
| Finish | Chrome |
| Voltage | 6, 12, 24 or 32 |
| Dimensions | 13" long, 7½" high |
| Net weight | 11¼ lbs. |
| Brackets | Bar or Pedestal |

*(Either Red or Green Lights Available)*

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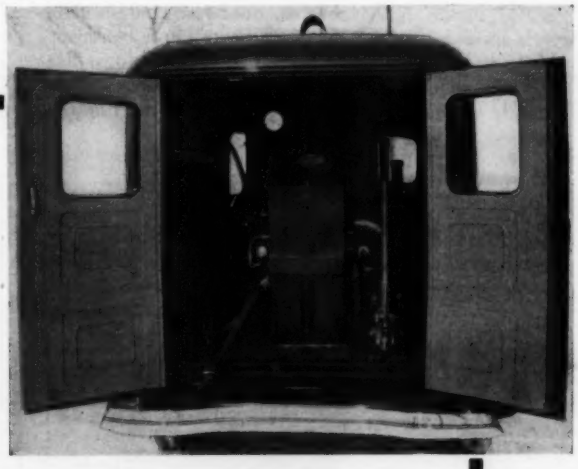
A SIREN ***ROAR*** . . .
A ***FLASH*** OF LIGHT

***Instantly recognized by day or night***

*Photo shows a Bryan Steam Thawing Unit on enclosed truck.*



# BRYAN STEAM THAWING UNIT

## *Prepare NOW for Next Winter!*

DON'T wait until freezing weather strikes before you start thinking of means of thawing frozen hydrants. Investigate the advantages of a Bryan Steam Thawing Unit now. You will find the price exceptionally reasonable and the unit itself exceptionally dependable and highly efficient. It thaws a frozen hydrant in about 2 minutes. You will find it useful on frozen water mains and in keeping apparatus free of ice. New York has 15 in service. Better write for information now.

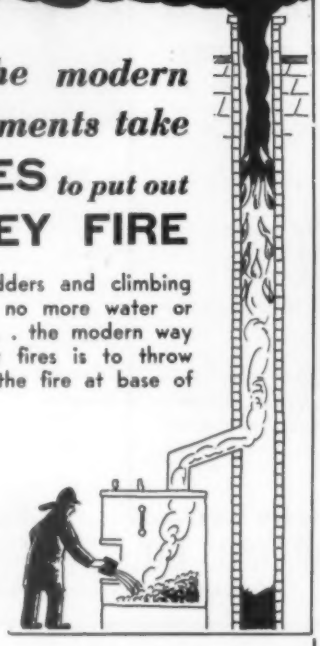
**BRYAN STEAM CORP. PERU, INDIANA**

*We shall appreciate your mentioning* FIRE ENGINEERING *when writing advertisers*

# SOOT BLAST
*Puts out chimney fires*

**NOW** *the modern Fire Departments take* **5 MINUTES** *to put out a* **CHIMNEY FIRE**

No more raising ladders and climbing over slippery roofs; no more water or chemical damage . . . the modern way to put out chimney fires is to throw SOOT BLAST over the fire at base of chimney.



*It's simple— just throw it on the Flames*

SOOT BLAST is inexpensive, does not contain zinc. It is used by the U. S. Government and hundreds of up-to-date fire departments in cutting down fire and water damage by putting out chimney fires quickly and effectively. Don't be behind the times—use SOOT BLAST.

**PRICES**
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**$4.50** per case

**$12.50** in 100 lb. bags

**CANADIAN DISTRIBUTORS**
THE LA FRANCE FIRE ENGINE AND FOAMITE, LTD.
TORONTO, CANADA

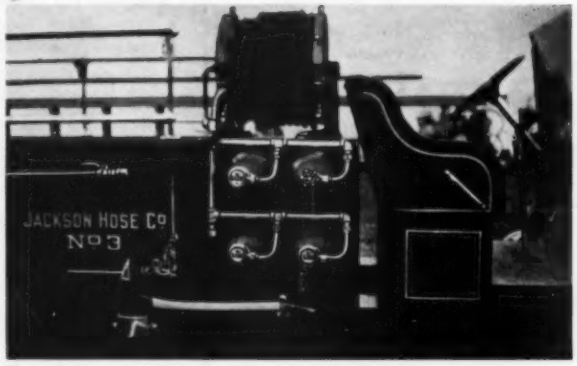
**$6.00** a case of Twelve 26 oz. packages in Canada

**DEALERS WANTED**
Wide-awake men can use their time to profitable advantage in distributing SOOT BLAST. *Write us for dealer proposition.*

**THE STEBIS COMPANY**
**MINNEAPOLIS, MINN.**



# A REAL SOLUTION
## *for Rural Fire Department Problems*




***The LUX Equipped Truck, showing LUX carbon - dioxide cylinders, hose reel and handle of LUX Discharge Horn. . . . Carbon - dioxide capacity — 300 pounds.***

**HERE is a truck unit, moderate in cost, that meets a long-felt need in fire-fighting everywhere. The LUX equipped Truck is of particular value in communities having many isolated fire hazards or where water supply and pressure are undependable.**

**Use any ordinary truck chassis. Mount on it these two amazingly effective units:**

**1 — the heavy artillery — a battery of 2 or more LUX cylinders, containing pressure-stored carbon-dioxide. LUX gas, the fastest known extinguishing agent, is delivered to the fire through a reeled hose with LUX's patented Shielded discharge horn.**

**2 — the Kidde Conversion Unit. It delivers pure water from a 40-gallon tank without using booster pump or soda and acid charges. A small carbon-dioxide cylinder produces sufficient pressure to discharge a 40-gallon tank *4 to 6 times at the scene of the fire.***

Two men can handle this truck. Installation may be made by any competent mechanic.

Within a few days we shall release a new folder, "Modern Equipment for Modern Fire Departments," describing both units. Write for your copy.

LUX

**Walter Kidde & Company**
**107 WEST STREET**
**BLOOMFIELD, N. J.**

line. In the event that neither foam nor other extinguishers mentioned are at hand, fire may be smothered by covering the tub with wet canvas, wet burlap, etc.

(d) The chief dangers due to the presence of acetylene gas are possible explosion, and asphyxiation of men working in buildings. Ventilate thoroughly, and locate as quickly as possible the source of the gas. If oxy-acetylene apparatus is not being employed, or other equipment wherein compressed acetylene gas is used, there will likely be found calcium carbide which has been wetted, and thus giving off the acetylene gas. In any case, ventilate thoroughly, and keep water away from the calcium carbide when extinguishing the fire. Carbon tetrachloride extinguishers are most effective on the calcium carbide fire, for, unlike foam and water streams, they possess no water and do not increase the generation of gas. If the gas seems to be present in large quantities, that is, if it is in high concentration in the air, thorough ventilation should be resorted to before men enter the building, due to the danger of explosion. Furthermore, men operating in a building, wherein is found acetylene gas in considerable quantities, should be protected with gas masks or self contained breathing apparatus.

(e) Enter the building and make thorough inspection. Determine the cause of the alarm, if possible. It takes but a small fire to set off an automatic alarm, and such a fire may not be detected from the outside of the building, or even from floor below.

3. The usual practice in opening a floor for cellar ventilation is to open it near a window. This permits the smoke and heat arising to pass out through the window to the atmosphere. Where thorough ventilation is required, a board is usually ripped up the length of the building in an aisle. While this operation creates a hazard by making an opening into which men operating on the floor may step and fall, still it is the quickest way of thoroughly ventilating a basement, wherein chemicals or other materials are burning and which, when afire, cannot be handled by the usual methods employed in combatting basement or cellar fires.

4. True; 5. True; 6. True; 7. True; 8. True; 9. True; 10. True; 11. True; 12. False; 13. True; 14. True; 15. False; 16. True; 17. True; 18. True; 19. True.

20. . . . the control of the stream which it gives.

21. . . . sparking may ignite inflammable dusts in the air, causing explosion.

22. . . . pulmotor . . . inhalator.

23. . . . water absorbs ammonia gas in large quantities and cools ammonia cylinders, piping, etc.

24. . . . cellar pipe. . . .

## San Francisco Has Fatal Hotel Fire

Seven persons died and eighteen were injured in a fire that swept through a four-story frame hotel in the South-of-Market Street rooming house district of San Francisco.

A sixty-year-old woman was killed when she jumped from a window as firemen were about to rescue her.

Firemen extinguished the blaze in two hours. It is believed to have been started by an incendiary.

## Thermopolis Host to Firemen

The tenth annual convention of the Wyoming State Firemen's Association was held at Thermopolis, Wyo., June 15 to 17, with Chief James A. Sheehan, of Rawlins, presiding.

D. G. Mulligan, Engineer, Mountain States Inspection Bureau, spoke on "Requirements for Fire Apparatus in Small Cities and Towns."

Herbert Watson, Investigator, National Board of Fire Underwriters, gave a talk on "Investigation of Incendiary Fires."

Glen Scott, District Manager, American-LaFrance & Foamite Industries, Kansas City, Mo., spoke on the "Modern Trend of Fire Department Apparatus."

Chief J. T. Patrick, Laramie, was in charge of the round table discussion.

The new officers are J. T. Patrick, Laramie, President; E. T. Payton, Lusk, First Vice-President; E. Walsh, Thermopolis, Second Vice-President; M. T. Siray, Rock Springs, Third Vice-President; M. S. Jordan, Wheatland, Secretary, and B. S. Bowan, Wheatland, Treasurer.

## Westchester Chiefs Addressed by Ex-Chief Kenlon

Ex-Chief John Kenlon, of the New York Fire Department, was the principal speaker at the final meeting for the season of the Fire Chiefs' Emergency Plan, held at Fire Headquarters, Larchmont, N. Y., on Wednesday, June 17. The Plan was welcomed by Mayor Watson, of Larchmont.

President Wooley, who presided at his first meeting, then introduced Chief Kenlon, who spoke on the need for order and discipline in the Fire Department, whether paid or volunteer. He also urged the companies to maintain their espirit-de-corps, so that the people of the community will hold the Fire Department in respect and be proud of it. The keystone of success in a fire company is the obedience to orders at a fire. If this is not done, the organization will go to pieces. The officers must hold the respect of their men. Chief Kenlon also spoke of the necessity for calls for outside assistance to come from one in authority, to avoid confusion at large fires.

Chiefs Gibson, Mount Vernon, and Grabb, New Rochelle, spoke of their Fire Schools and invited any of the officers present to attend the schools. A member brought up the question of injury to a visiting officer. The matter was referred to Judge Hoop.

The next meeing night was announced as Wednesday, October 21, place of meeting to be decided later. There was an attendance of 95, and the average attendance for the year, according to the Sergeant-at-Arms, was 80.

## Old Fire Department Records

About fifty volumes of a wide assortment of material on the early history of the New York volunteer companies have been recently unearthed. Some of the documents included are:

Manhattan Engine Co. 8, 1851, miscellaneous collection of souvenir tickets, scrapbook, newsprints and many reports of fire.

Presentation scrapbook by Richard Evans, President, Association of Veteran Firemen. This includes letters from Mayor Hugh Grant, New York City, 1880, prints of old hand pumps, etc.

Several volumes of official minutes including organization of famous 73d Regiment N. Y. Volunteer Association, 2nd Engineers Zouaves—4th Regt., Excelsior Brigade, 1880.

Report of testimony of investigation of the Metropolitan Fire Department, February, 1868. Any one interested in the above may write to M. Harris, 77 Fourth Avenue, New York City.

**Santa Rosa, Cal., Has Worst Fire Since 1906**

Fire, which started in an electrical shop at Santa Rosa, Cal., forced one hundred persons to flee in their night clothes and completely destroyed the new Santa Rosa Hotel. It also destroyed a large department store and four other shops. This business district fire was the worst in the history of the city since 1906. The damage was estimated at $750,000.

# THE ROUND TABLE

## For Practical Discussion of Current Fire Department and Fire Management Problems

## SPRINKLER SYSTEM PRACTICES

SPRINKLER systems have been designed to quench fire in buildings, while still in the incipient stage. Such installations have been the means of preventing many serious conflagrations.

But no sprinkler system will operate without water. Therefore, it is necessary to make tests to determine if the mains in the street have sufficient capacity to supply the proper amount of water.

Fire Departments when rolling in to sprinklered buildings, as a rule, require that hose lines be laid immediately as a second line of defense. If the water pressure is poor, the pumpers are used to supply water to the sprinklers.

In the box on this page is the question in full that is discussed in this issue. Due to the large number of replies, the discussion will be concluded in the next issue. Should you have some comments that you would like to add regarding this problem, you are invited to write to the "Round Table Editor," FIRE ENGINEERING, 24 West 40th Street, New York, N. Y.

### Discussion of the Question

**M. J. Corrigan, Chief Fire Marshal, Chicago, Ill.:** The principal water supply to sprinkler systems in our city is the water supplied by Lake Michigan, through the city's water distribution system.

The fire ordinances of our city provide that sprinkler systems and standpipe systems installed in buildings of any great height shall be provided with either gravity tanks, properly elevated above the building, pressure tanks, fire pumps and outside siamese Fire Department connections.

Our systems are either one, two or three source systems.

Fire flow tests have been made in all sections of our city by both the National Board of Fire Underwriters and the Water Pipe Extension Bureau and such recommendations are made from time to time that will provide adequate supply of water for fire purposes in the various classified areas of our city.

With reference to the rules as to connecting engine lines to sprinkler siamese the following sections of the rules and regulations governing the Chicago Fire Department are quoted:

"It shall be the duty of every officer of the department to study and acquaint himself with the construction and principles of the different designs of sprinkler systems in use in the city of Chicago, and to inspect and familiarize himself with all such systems installed in his district, noting the location of gravity and pressure tanks, shut offs and drains, valves and siamese connections

"Officers of the department shall report to the Fire Commissioner, attention of Bureau of Fire Prevention, any defects in the sprinkler system installed in their respective districts and call attention to the same of the owner, occupant or management of the buildings wherein the same are located.

"Whenever a fire occurs in a building equipped with a sprinkler system, the companding officer of the first engine company to arrive shall immediately connect his first line into the sprinkler system and charge the same, after which he shall proceed to place the second line in operation, unless the situation clearly demands that the procedure be reversed."

**James Sweeney, Chief, Superior, Wis.:** The principal water supply that serves the sprinkler systems of large grain elevators in this city is taken from the bay. Other sprinkler systems are supplied from city water mains.

Static and flow tests have been taken and hydrants on six-inch dead end mains that supply water to sprinkler systems are painted yellow to indicate that if engines are connected to such hydrants, the hose lines from engine must be connected to the siamese connection that serves the sprinkler system.

Hydrants on private water mains that serve sprinkler systems are painted red to indicate that fire engines must pump into their mains.

The first engine to arrive at a fire in a sprinklered risk must connect to the siamese connection that serves the sprinkler system only.

**O. T. Sanborn, Chief, Portland, Me.:** The principal water supply to sprinkler systems in my city is the water mains. There are a few installations, however, that have a secondary supply from water tanks, and on the higher elevations automatic electric pumps are used.

No tests have been made to determine whether or not engines would rob sprinkler systems in event of a fire, but owing to the fact that our water mains are of ample size with well arranged grid or cross connections the possibility of such a thing happening is very remote.

In the event of a fire in a sprinklered building, the standing rule of this department is that the second due engine company to arrive at the fire shall connect lines to the sprinkler siamese and hook up the pump ready to increase the pressure in the sprinkler system if necessary.

**John J. Kelly, Chief, Scranton, Pa.:** The city of Scranton has an abundant water supply in the business and congested section of the city. We have a direct water pressure of 90 pounds from 6, 8, 10, and 12-inch mains, which are fed from 16 to 36-inch mains.

All sprinklers have steamer connections and few of our tallest buildings also have the roof tank. Never to my knowledge has the water supply to a sprinkler system been reduced by a fire stream.

When connecting engine lines to sprinkler siamese, two lines are stretched from pumper and connected to sprinkler connection on building, and a pump pressure is maintained as the situation exists.

**C. L. Ingram, Chief, Montgomery, Ala.:** In our city, the principal water supply to the sprinkler systems is from the water mains, which furnish us from 100 to 120 pounds pressure. Our experience with this source of supply and this amount of pressure has been very satisfactory in the past.

I don't believe the engine would rob the system, for the reason that where the most heads would be involved of course, is in the downtown district and we have from 110 to 120 pounds pressure. A test has not been made to prove this statement.

The rules for connecting into the sprinkler siamese is to connect any time we have reason to believe that enough heads have been or are likely to be involved, to lower the pressure from the main to dangerous point. I mean by this that the pressure that we have on the mains might not furnish sufficient supply, if a considerable

### HERE IS THE PROBLEM

**What is the principal water supply to sprinkler systems in your city?**

**If from water mains, have tests been made to show whether engines will rob the sprinkler system?**

**What are the rules as to connecting engine lines to sprinkler siamese?**

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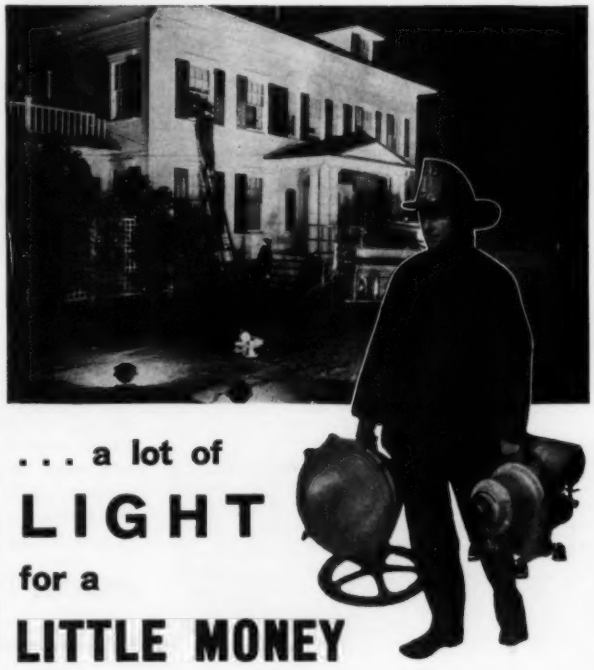
# For Night Fires



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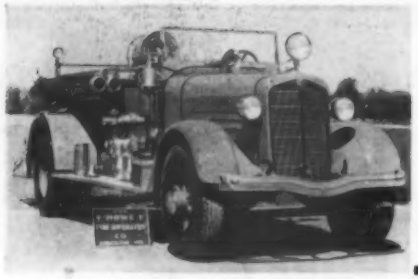

We are now located in our new plant — five times as large as the old one — where we will be better able to meet the needs of all customers. The modern, streamlined, Howe apparatus excels anything that we have ever built. It is even more efficient and more dependable and we suggest you inspect some of our recently built trucks if you are planning on modernizing your department. Write us for information on any particular unit in which you are interested.

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AFTER BEING
# PROVAR PROCESSED

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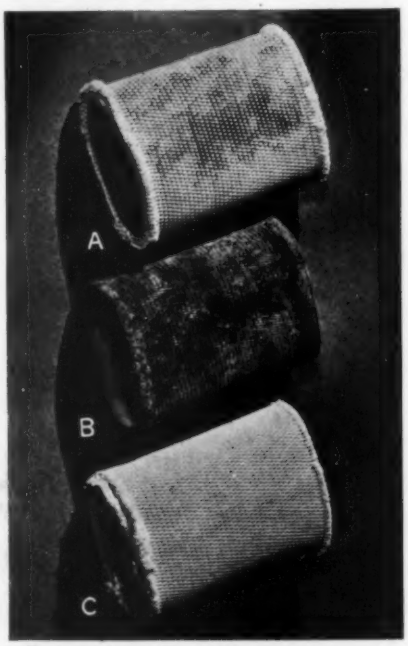
The PROVAR PROCESS is permanent—will not wash out. It means longer life to your hose, greater economy, greater safety, and—the price is the same as regular hose!




**A** Not processed for mildew protection.
**B** Processed for mildew protection by a competitor.
**C** PROVAR PROCESSED Republic Fire Hose —no sign of mildew.

• • •

Unretouched photo showing results after samples were saturated with water and exposed to moist atmosphere for six months.

THE REPUBLIC RUBBER CO.
YOUNGSTOWN, OHIO

Republic **FIRE HOSE**

number of heads were blown, without being boosted by means or a pumper or pumpers.

We have been very fortunate in this operation and I think it is advisable in all cases where one is in doubt about the heads involved to connect to the siamese and stand by for orders to pump into the system.

**Earl A. Traeger, Chief, Minneapolis, Minn.:** The principal source of supply to sprinkler system is water mains, augmented by gravity tanks and, in some instances, pressure pumps.

No tests have ever been made to show whether pumpers would reduce the amount of water needed for such systems. However, this is a question that is determined by the size of the main, the amount of water available for fire service above the amount needed for peak of domestic consumption.

Our rules as to connecting lines to sprinkler siamese connections are as follows:

"In case of a fire occuring in a building equipped with a sprinkler system, the second company into alarm shall cover the sprinkler system.

"Combination engine companies: The commanding officers of combination engine companies will report to the officer in charge of the fire before laying into sprinkler systems.

"By covering the sprinkler system, it is not intended that the indicated companies lay lines into such system, indiscriminately, but rather that such systems will be covered by some prearranged plan and designation of responsibility if the fire and occasion require it."

**A. McC. Marsh, Chief, Columbia, S. C.:** Sixty per cent of our sprinkler systems are supplied from our city water mains and forty per cent are supplied from our city water mains and auxiliary tanks.

Yes, there are a few places in our city where engines will rob the sprinkler system, but our firemen know the places and they have orders to lay lines from engine to sprinkler siamese on arrival.

The rules require that when we arrive at a fire that has a sprinkler system, if it is in the part of the city where we know the water pressure is low, to lay in lines and connect to sprinkler siamese at once.

**A. A. Buss, Chief, Wausau, Wis.:** The principal water supply to the sprinkler systems is from the water mains. The normal water pressure is 65 pounds. Whenever the fire alarm is sounded at the fire stations, it is also sounded through the Gamewell fire alarm system at the pumping station, which has the same hook-up as we have in the fire stations. The engineer at the pumping station then boosts the pressure 20 pounds for each fire alarm. We have a signal system through the fire alarm box or by telephone to tap off pressure if pressure is not needed, which is taken care of by the first officer to reach the fire. We have a program now to have all our sprinkler systems equipped with Fire Department connections. We have eighteen sprinkler systems in our city and all but two have Fire Department connections. I am sure we will have one more of these with Fire Department connections before the summer is over.

The Fire Department keeps well posted on the water system and tries to work accordingly without robbing the sprinkler systems, when connecting engine lines to sprinkler siamese. Tests have been made of our water mains by the National Board of Fire Underwriters and Wisconsin Rating Bureau, and some spots have been found to be weak.

We haven't any set rules as to connecting up to the sprinkler systems, but the Fire Department is very familiar with sprinkler systems and know they are installed for a definite purpose. All officers make a tour of inspection twice a year to keep themselves well posted with the different sprinkler systems in our city. We are fully sold on sprinkler systems. To prove this statement, I have recommended to the Common Council that all fire stations be equipped with pumpers not less than 750 g.p.m. each; they went on record in favor of such a program.

**W. N. Bates, Chief, Elyria, Ohio:** There are 19 plants with automatic sprinkler systems in Elyria. The primary source of water supply in all cases is from the city water mains. In addition to the primary source of supply, seven plants have a secondary source of supply from elevated tanks and five from both elevated tanks and fire pumps, taking draft from reservoirs. Eleven of the nineteen plants have yard hydrants and fifteen have siamese connections to their sprinkler systems.

Tests are made by insurance inspectors to see if the water supply is adequate for both sprinkler systems and Fire Department pumpers.

We have no specific rules for connecting engine lines to sprinkler siamese because of the small size of our department but in all cases of fire with the sprinkler system in operation and a siamese connection available, if two pumpers were present, the second pumper responding would be directed to connect the siamese connection.

**Wm. L. Ryan, Chief, Dubuque, Iowa:** The water supply to sprinklered buildings is supplied from three sources, namely, high pressure gravity fed water mains, having approximately 156 pounds pressure; low pressure gravity fed water mains having approximately 95 pounds pressure and private standpipe systems having varying pressure from 50 pounds upward.

As there are but few hydrants supplied by our high pressure system, these are not used when a sprinklered building is involved. If these hydrants were used, it would make but little difference, as all high pressure systems are reinforced by the low pressure mains. When sufficient sprinkler heads are in operation to lower the pressure on the system to that of the low pressure system, the low autoatically cuts in, by use of check valves, assuring a much greater supply of water but at a lower pressure.

The second company to arrive at a fire in a sprinklered building immediately lays two lines from a low pressure hydrant to the steamer connection and makes ready to supply additional water to the system involved.

**Charles J. Brennan, Chief, San Francisco, Cal.:** The principal water supply to sprinkler systems in San Francisco are the mains of the municipally owned domestic water supply system.

No special tests are made to show whether engines will rob the sprinkler system. The Engineers of the Board of Fire Underwriters, who are supervising the installation of sprinkler systems, are satisfied that the prevailing sizes of mains and the gridironing of same as practiced here, assure adequate supplies.

When responding to fires in sprinklered buildings, the first stream of the second engine to arrive, is connected to sprinkler siamese.

**Chris Noll, Chief, Poughkeepsie, N. Y.:** The principal water supply to sprinkler systems is direct from city mains. We have some supplied from tanks but the majority are direct from the city service.

Water mains have been tested and are sufficiently large with enough pressure and volume so that they are not affected if the engines are used on the same mains that supply sprinkler systems.

Either the first or second due companies connect to sprinkler siamese, depending on the location of companies answering alarms.

**Daniel H. Shire, Chief, Mason City, Ia.:** In our city the principal water supply to sprinkler systems is water mains.

It appears to me that the possibility of engines robbing the sprinkling system is very remote. However, it might occur, if there was a fire of great proportions.

First line is connected to outside sprinkler connections from the engine, but is not charged unless needed. If charged, engine operates at 100 pounds, unless ordered otherwise into sprinkler system. All systems when installed are given a pressure test of 250 pounds for ten minutes, through outside Fire Department connections with engine operating, and if leaks are found or hangers become loose, repairs are made and tests made again.

**Albert Luedeke, Chief, Freeport, Ill.:** The Illinois Water Service Company is our principal water supply for our sprinkler systems.

We have a 100,000-gallon tank and a 50,000-gallon tank, which give us a steady volume of water. We, therefore, do not have any trouble with supplying sprinklers.

Rules governing the connecting of engine lines to sprinkler siamese are as follows: Pipe size should not be less than four inches for pumpers and six inches for fire boat connections, and each connection shall be fitted

## THIS DISCUSSION WILL BE CONTINUED

**Due to the large number of Chiefs who responded to this problem, and the length of the discussion, the comments have been divided into two installments and will be concluded in the next issue.**

with a straightway check valve, not with a gate valve. Siamese connections should be of approved type. Connections should be so located as to provide for prompt and easy attachment of hose. The capacity of the pump should never be less than 500 gallons per minute, when it supplies sprinklers only.

**Irby Klinck, Chief, Memphis, Tenn.:** With but a few exceptions sprinkler systems in our city are supplied from a cut-in on the city mains to their underground, reinforced by siamese equipped with governing check valve.

Companies are designated specifically to cut in on sprinkler systems and supply water only on orders from commanding officer, and to start with 100 pounds pressure, and graduate up only on orders from commanding officer.

**L. P. Willis, Chief, Pueblo, Col.:** Water mains are our principal source of supply for sprinkler systems.

No tests have been made to indicate whether engines would rob the sprinkler system, but in most districts in our city where sprinkler systems are installed, we have a good supply of water. I don't think we could draw enough water to make any difference on our mains.

We have no set rules in regard to connecting engine lines on siamese sprinklers.

**B. M. Blake, Deputy Chief, Los Angeles Cal.:** Sprinkler systems are connected directly to mains, with pressure storage tanks on roofs of buildings and pumper connections on sidewalk lines.

Dependence of sprinkler systems on mains and tanks is not complete, and pumps are connected to inlets when thought advisable. Pumps are connected to inlets on all sprinkler risks, if fire has gained enough headway to warrant such action.

**W. P. Weeks, Battle Creek, Mich.:** The Michigan Inspection Bureau has the supervision of all automatic sprinkler systems, and they also have charge of the inspections on sprinkler systems.

A record of all sprinkler systems is kept at the fire alarm office, and all of the officers and men in the Fire Department are well versed on same. Whenever there is a fire in which a sprinkler head is discharged, the department does not leave the building until they have restored the system to working order.

**Frank M. Davis, Chief, Danville, Ill.:** All of our wet sprinkler systems are from water mains, the one dry system from a tank on roof, but the tank is fed with a 6-inch main.

No tests have been made to determine if pumpers might rob the sprinkler systems.

My rule, and the periodic school of instruction that I hold with the members, provide that first lines shall be connected to siamese, but pressure must not be directed to the sprinkler without orders. Our fire pressure from pumping station is around 90 pounds in mercantile district and our department pumps would not be necessary unless several heads opened.

**John A. Fisher, Chief, Duluth, Minn.:** Sprinkler systems in our city are supplied from city water mains. In the business district water mains run in size as follows: 12-inch, 16-inch, 20-inch and 24-inch mains with 120 pounds pressure.

We have not made any tests to show whether engines will rob the sprinkler system, but will venture to say that they won't—of course, this is merely an assumption.

We do not, as a rule, connect to the sprinkler siamese upon arriving at a fire, unless the fire has gained considerable headway. Then we use every means available to bring it under control.

**G. Anselm, Chief, Wyandotte, Mich.:** Sprinkler systems are supplied through our mains from our city water supply and one factory is supplied by gravity tank and pump pressure.

Such test was made by the Underwriters and the supply was shown not to be great enough to supply sprinkler system.

It is a rule of the department for the first arriving pumper at the fire to connect the first line to the sprinkler system, and to maintain pressure not more than eighty-five pounds, unless otherwise directed.

**Alex Dotson, Chief, Elkhart, Ind.:** The principal water supply to sprinkler systems in our city is from water mains direct, and also supply tanks.

As we have had no fires where sprinkler systems were to be used, we have no hard and fast rule. Conditions at the time of the fire will determine the procedure.

* * *

## ANSWERS TO PREVIOUS QUESTION

*The following reply was received in answer to a previous question as to whether fire fighting operations were curtailed during the recent floods:*

**W. F. Hough, Chief, Labanon, N. H.:** Fire Department operations were not curtailed during the flood period.

Firemen in rowboats assisted in moving families from the Mahan Flat section to places of safety. Assistance was also given at the Mascoma Dam, where over 2,000 sand bags were placed to hold the water back.

Row boats, floodlights and pumps to be used in pumping out cellars would be desirable equipment in a similar emergency.

## King Heads Ohio Fire Chiefs

Harry A. King, Chief, East Cleveland, Ohio, was elected President of the Ohio Fire Chiefs Association at the nineteenth annual convention held at Steubenville, June 23 to 25.

The other officers elected are Chief G. L. Frock, Springfield, First Vice-President; Chief Thomas Closser, Yorkville, Second Vice-President; Phillip J. Harty, Chief, Youngstown Sheet & Tube Co., Youngstown, Secretary-Treasurer; Chief Edward Green, Steubenville, and Assistant Chief J. A. Welsh, Columbus, Directors.

Instead of separate sessions for paid, volunteer and industrial department officers, there was a combined conference.

Prof. K. W. Stinson, Ohio State University, gave a report of the state and regional fire school, a brief outline of the proposed firemen's training course was given by R. B. Criswell, Ohio Inspection Bureau, Columbus.

It is interesting to note that several anniversaries were observed during the convention. Steubenville observed the fiftieth anniversary of the paid Fire Department; it marked the thirty-fifth wedding anniversary of Chief Edward J. Green.

The 1937 convention will be held at Chillicothe. An invitation was also extended by Cleveland.

## Chief Nominated for Lieutenant-Governor

Chief Henry Schricker, of Knox, Ind., was nominated candidate for Lieutenant-Governor at the State Democratic Convention. For some years he has held the office of State Senator from Starke County.

Indiana firemen feel that, if elected, he will do considerable work for the state firemen.

## A. A. Bell Dies

Alfred A. Bell, for many years identified with the fire prevention field as an insurance engineer for the Continental Insurance Company, New York City, died at his home in Morristown, N. J., after a long illness.

He was born in Newburgh, N. Y., October 1, 1882. While a small child, his parents moved to Morristown and he has lived in that municipality ever since.

Mr. Bell was a member of the Editorial Advisory Board of FIRE ENGINEERING, and for many years closely associated with the Morristown Fire Department.

He was a member of the Masonic Lodge, and active in church affairs.

Surviving are his widow and a sister.

## Dr. Price on Tour

Dr. David J. Price, Chemical Engineering Division, U. S. Department of Agriculture, has planned a speaking tour that will keep him on the road for about a month.

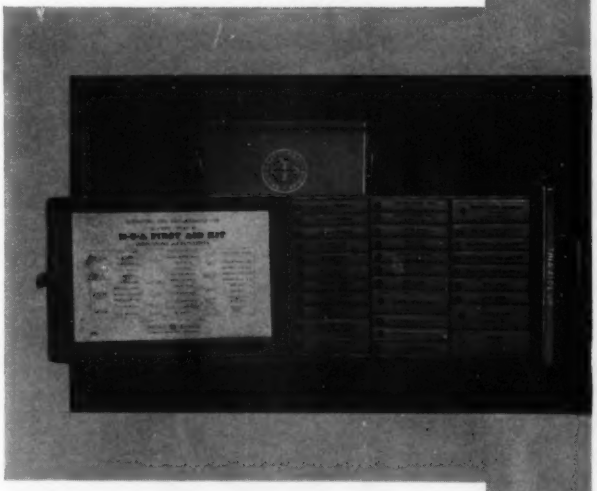
In addition to the Texas Fire School on July 15 and the Pacific Coast Fire Chiefs' Conference in Seattle on July 21, he will visit a number of departments to discuss the problem of dust explosion hazards during fire-fighting operations. A new dust explosion motion picture reel, with sound effects, will be shown at these meetings.

The itinerary follows:

July 13—Monday—St. Louis, Mo. (3:15 p.m. to 5:30 p.m.)
July 14—Tuesday—Dallas, Texas
July 15—Wednesday — College Station, Texas (Texas Firemen's School)
July 17—Friday—Denver, Col.
July 19-20—Sunday, Monday — Spokane, Wash.
July 21, 22, 23 — Tuesday, Wednesday, Thursday—Seattle, Wash., and Vancouver, B. C. Pacific Coast Fire Chiefs' Conference.
July 24-25—Friday, Saturday—Portland, Ore.
July 27-28—Monday, Tuesday—San Francisco, Cal.
July 29, 30, 31 — Wednesday, Thursday, Friday—Los Angeles, Cal.
August 2—Sunday—Salt Lake City, Utah
August 4—Tuesday—Chicago, Ill.
August 5—Wednesday—Waukesha, Wis. Wisconsin Paid Firemen's Association Convention
August 6-7—Thursday, Friday—Chicago
August 8—Saturday, Washington, D. C.

# M·S·A FIRST AID EQUIPMENT

*Covers all your first aid requirements*



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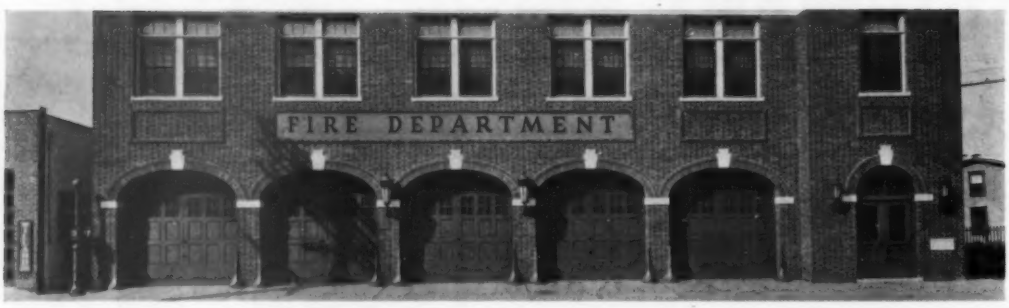


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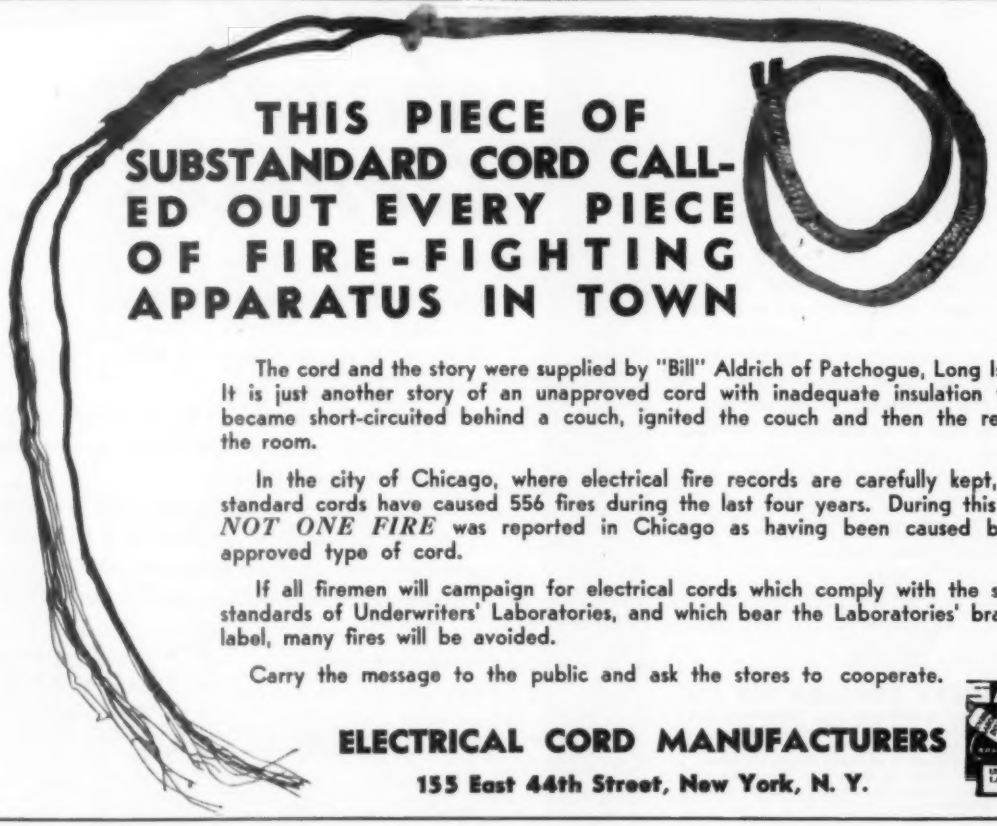

**THIS PIECE OF SUBSTANDARD CORD CALLED OUT EVERY PIECE OF FIRE-FIGHTING APPARATUS IN TOWN**

The cord and the story were supplied by "Bill" Aldrich of Patchogue, Long Island. It is just another story of an unapproved cord with inadequate insulation which became short-circuited behind a couch, ignited the couch and then the rest of the room.

In the city of Chicago, where electrical fire records are carefully kept, substandard cords have caused 556 fires during the last four years. During this time *NOT ONE FIRE* was reported in Chicago as having been caused by an approved type of cord.

If all firemen will campaign for electrical cords which comply with the safety standards of Underwriters' Laboratories, and which bear the Laboratories' bracelet label, many fires will be avoided.

Carry the message to the public and ask the stores to cooperate.

**ELECTRICAL CORD MANUFACTURERS**
**155 East 44th Street, New York, N. Y.**

# Questions and Answers

**NOTE—Readers are invited to send in questions, which will be answered in the order received. Names are omitted from questions unless otherwise specified**

## Getting Full Capacity of Pumper

*To the Editor*:

A pumping engine is rated to deliver 750 g.p.m. at a net pump pressure of 120 pounds. It is operating at a pressure of 117 pounds, supplying two lines of 2½-inch hose, each line 300 feet long with playpipe having 1-inch nozzle. If a third line 550 feet long, same size hose, is connected to this pumper, what size nozzle would be used to obtain, but not exceed, the rated capacity of the apparatus? H. W. B.

*Answer*: In the problem you submit no mention is made of the type of pump employed nor whether it is pumping from hydrant or from suction, etc. We will therefore assume that it is taking water at practically no pressure so that it has no help from the hydrant.

Theoretically (but not practically) a pumping engine develops the same power at all pressures. Bearing this in mind, it is a simple matter to find what it should discharge at any other pressure than its rated pressure.

This pumper is capable of discharging 750 gallons per minute at 120 pounds pressure. To find what it will deliver at 117 pounds we will multiply 750 by 120 and divide the product so found by 117. This is 769 gallons per minute.

The first step in the solution is to find how much water is discharged from the two one-inch nozzles on the 300 foot lines of 2½-inch hose when the engine is operating at 117 pounds pressure.

N.P. = E.P. ÷ (1.1 + K L).
= 117 ÷ (1.1 + .105 x 6).
= 117 ÷ 1.73 = 67.63 pounds.

Discharge in gallons per minute equals $29.7 \times d \times d \times \sqrt{p}$.

Where "d" is the nozzle diameter in inches, and "p," the pressure in pounds per square inch.

Discharge = $29.7 \times 1 \times 1 \times \sqrt{67.63}$.
= 244 g.p.m.

There are two such nozzles operating so that the discharge from the two of them is 2 x 244 or 488 g.p.m.

If the pump pressure is maintained at 117 pounds we will then have 769 — 488 or 281 g.p.m. for the remaining nozzle.

The best method to find what size nozzle may be used is the "trial and error" method.

This consists of assuming the different nozzle diameters and then calculating for the discharge therefrom. The one which comes nearest to giving the available water, but does not exceed it, is the size nozzle which would be used.

First assume an inch nozzle.

N.P. = 117 ÷ (1.1 + .105 x 11).
= 52.3 pounds approximately.

Discharge at this pressure is 214 g.p.m. approximately.

This discharge is considerably below what we have to account for (281 gallons per minute) so we will make a new assumption.

This time we will use a 1⅛-inch nozzle.

N.P. = 117 ÷ (1.1 + .167 x 11).
= 39.8.

Discharge equals $29.7 \times 1\frac{1}{8} \times 1\frac{1}{8} \times \sqrt{39.8}$ or 236 g.p.m. approximately.

This amount, too, is too small.

Therefore we will assume a 1¼-inch nozzle.

N.P. = 117 ÷ (1.1 + .248 x 11).
= 29.8 pounds.

Discharge at 29.8 pounds equals $29.7 \times 1\frac{1}{4} \times 1\frac{1}{4} \times \sqrt{29.8}$ or 253 g.p.m.

Even this figure gives us some leeway, so we will take the next larger size nozzle, 1⅜-inch.

N.P. = 117 ÷ (1.1 + .341 x 11).
= 24.1 pounds.

Discharge at this pressure equals $29.7 \times 1\frac{3}{8} \times 1\frac{3}{8} \times \sqrt{24.1} = 276$ g.p.m.

From the standpoint of flow this would be the proper size nozzle to use. However, 24.1 pounds is pretty low as a nozzle pressure. As a matter of fact the pressure used for 1¼-inch nozzle, 29.8 pounds, is also low.

## Extinguishers for Forest Fires

*To the Editor*:

Is the use of chemical extinguishers in fighting small forest fires practicable? Any information will indeed be appreciated. W. E. M.

*Answer*: It is the writer's opinion that the use of chemical extinguishers in fighting small forest fires is impracticable. Briefly his comments on the different types of extinguishers are as follows:

Dry powder: Too much spread of fire. Carbon dioxide released from the bicarbonate of soda in the extinguisher would be carried away by any breeze present, and thus the extinguishing effect would be small.

Carbon dioxide gas extinguisher: Gas discharged from this extinguisher would not remain in the zone of the fire and thus would be limited in its effect. Furthermore, the great cost of carbon dioxide gas, together with the weight of containers needed, would seriously handicap their use in forest fires. It would not be possible to cover trees ablaze with the gas from these extinguishers, due to the fact that the gas stream could not be projected any great distance in the atmosphere.

Carbon tetrachloride: Heat required to vaporize carbon tetrachloride gas and the tendency of the gas to be blown away by breeze limit the effectiveness of this extinguisher to such an extent as to make it impracticable for use in combating brush and forest fires. Furthermore, cost would be excessive.

Foam extinguisher: Not practical on such broken surfaces as brush and trees provide. Too expensive.

Soda and acid extinguisher: (Hand type, portable tank type, and types mounted on apparatus.) The solution in a soda and acid extinguisher has no more extinguishing effect than plain water. In view of the fact that it requires considerable time to recharge extinguisher, plain water is better for fighting brush and forest fires than would be soda and acid extinguishers.

Frost-proof extinguishers (using a non-freezing solution, to be expelled from the extinguisher by puncturing cartridge of carbon dioxide gas): While the non-freezing solution may have a little more extinguishing effect than water, the advantage is so small as to be negligible. Furthermore, the time required to recharge would eliminate this type of extinguisher in handling fast traveling fires in brush and trees.

Methyl bromide: Effective for small fires where there is no breeze, but ineffective where breeze would carry away gases as quickly as generated. Furthermore the extremely high cost of this liquid makes it impracticable for any but small fires in confined spaces.

Loaded stream (water charged with potassium salts): Effective in closed area where gas created by vaporization may be kept around the zone of combustion. Ineffective in open areas, and thus has the same disadvantages of carbon dioxide gas. Furthermore, excessive cost would bar the use of this type of extinguisher.

Water: Water is the most effective extinguishing agent for brush and forest fires.

Fires are extinguished by one of two means: (a) smothering, (b) quenching. The first method requires surrounding the fire with a blanket of gas or else excluding air from it by applying a coat of foam over the burning material. All of the extinguishers listed previously would require tremendous quantities of gas.

Quenching, on the other hand, consists of merely cooling material which is burning to a point below its reignition temperature and thus extinguishing the fire. Water is effective in this latter regard. Water sprayed on burning grass or on trees not only extinguishes the fire quickly, due to the small amount of combustible material in the large volume of space represented by trees, but it also checks reignition of the materials, due to the fact that usually not sufficient heat is generated by the fire to vaporize the water sprayed on trees. Thus water not only extinguishes, but it also prevents rekindling. Furthermore, water can be secured at most any point or can be carried to the fire in tank trucks, booster tanks and motor

apparatus or in barrels; it can be applied in a variety of ways. In suburban New York, for example, it is employed in handling brush fires by use of ordinary five gallon sprinkling cans. Other departments use small portable hand pumps, with tanks mounted on the backs of the fire fighter, with excellent results. Still others employ small portable pumps or even large motor fire apparatus pumps, accompanied by long lines of hose.

# PROGRAM OF THE SIXTY-FOURTH ANNUAL CONFERENCE, I. A. F. C.

**Papers, Discussions, Demonstrations and Entertainment Scheduled for the Convention of the Association, to Be Held at the Royal York Hotel, Toronto, Ont., July 28 to 31**

FOLLOWING is the program of the sixty-fourth annual conference of the International Association of Fire Chiefs, which is to be held at the Hotel Royal York, Toronto, Ont., on July 28 to 31. The papers scheduled are of a very high order of merit from the practical fire fighting and fire prevention standpoint. All of Tuesday morning is to be devoted to the manufacturers of fire equipment and apparatus. They will be given an opportunity to describe their products and there will be a number of demonstrations staged at the ground set apart for this purpose, near the hotel. The entertainment includes a moonlight ride on Lake Ontario, picnic and dance on Centre Island and a civic banquet given by the city of Toronto.

**Tuesday, July 28—10:30 A.M.**

Memorial Service.

**2:00 P.M.**

Topic No. 1.—"Do Mutual Aid Systems Really Function?" by Chief John J. Brennan, Pelham Manor, N. Y.

Topic No. 2.—"Functions of the National Board of Fire Underwriters," by Wilbur E. Mallalieu, General Manager, National Board of Fire Underwriters, New York City.

Topic No. 3.—"Handling an Emergency Resulting from City-Wide Series of Gas Explosions in Sewers," by Chief Joseph N. Sullivan, Utica, N. Y.

Topic No. 4.—"Some Recent Arson Cases of Unusual Interest," by George O. Mansfield, Chief of Fire Investigation, Massachusetts State Police, Boston, Mass.

**9:15 P.M.**

Moonlight ride on Lake Ontario.

**Wednesday, July 29—9 A.M.**

Topic No. 5.—"Fire Departments Serve in Flood Emergency Wory," by Ex-Chief Richard Lee Smith, Pittsburgh, Pa., and Chief John C. Moran, Hartford, Conn.

Topic No. 6.—"Air Conditioning Brings New Fire Hazards," by George W. Booth, Chief Engineer, National Board of Fire Underwriters, New York City.

Topic No. 7.—"New Developments in Fire Resistant Lumber," by E. F. Hartmann, Pres., Protexol Corpn.

**2 P.M.—Symposium**

1. "How Often, and in What Manner, Should Fire Truck Brakes be Tested," by Chief Edward W. Gieselman, Syracuse, N. Y.
2. "What Course Should Be Pursued to Reduce the Number of Accidents in Which Fire Apparatus is Involved?" by Chief Walter Israel, Detroit, Mich.
3. "What Advantages and Disadvantages are There to Centralizing Fire Apparatus in Large, Centrally Located Stations?" by Chief Daniel B. Tierney, Arlington, Mass.
4. "To What Extent Should a Fire Department Provide Recreational Facilities for the Men in Fire Stations?" by Commissioner Wm. R. Castimore, Buffalo, N. Y.
5. "Are We Justified in Requiring Flame-Proofed Fabrics and Draperies in Theatres, Night Clubs, Restaurants and Other Places of Public Assembly?" by Chief Ross B. Davis, Philadelphia, Pa.
6. "Handling Cold Weather Problems During the Past Abnormally Cold Winter," by Chief Earl Traeger, Minneapolis, Minn.
7. "Is the 'Junior Fire Department' plan, whereunder boys of school age are coached in the rudiments of fire prevention work, a beneficial one?" by Chief Hugo Delfs, Lansing, Mich.
8. "How should the problem of out-of-town calls for fire apparatus be handled, particularly insofar as charges therefor are concerned?" by Chief Arthur Chambers, Yonkers, N. Y.

**5 P.M.**

Leave for picnic and dance on Centre Island.

**Thursday, July 30—9 A.M.**

Manufacturers Tell of Their Products. (Each exhibitor given an opportunity to describe briefly his exhibit, new developments, etc. Three minutes allowed each exhibitor for this purpose.)

Demonstrations of fire equipment and apparatus. (Demonstration grounds are located about 1,000 feet from the Hotel Royal York. Demonstrations will include various fire extinguishing agents, equipment, fire resistant treatment for wood, etc.)

**2 P.M.—Symposium**

9. "What Cooperation Do You Receive From the Public Utilities Where Presence of High Voltage Electrical Cables or Equipment is Interfering With, or Endangering the Work of, the Fire Department?" by John J. Towey, Newark, N. J.
10. "Regulating the Dry-Cleaning Industry," by Jay W. Stevens, State Fire Marshal, San Francisco, Cal.
11. "Is the Use of Radio Broadcasts Beneficial in Fire Prevention Work?" by Chief Frank Charlesworth, Providence, R. I.
12. "How Long Should Pneumatic Fire Truck Tires be Used Before Replacing?" by Edward Rumsey, Master Mechanic Fire Dept., Detroit, Mich.

**Round Table Discussions**

No. 1. "What is the present trend with regard to permitting companies and men to participate in out-of-town parades?"

No. 2. "Should the Fire Chief have a voice in the selection of fire hydrants?"

No. 3. "Should smoking be prohibited in theatres?"

No. 4. "What equipment and methods are employed in dewatering cellars?"

No. 5. "Have asbestos suits a place in the fire service?"

No. 6. "Is the closed body pumper here to stay?"

**8 P.M.**

Civic Banquet given by the City.

**Friday, July 31—9 A.M.**

Unfinished business. Selection of next year's convention city. Election and installation of officers.

## Chief Buel 40 Years with Parsons, Kansas

Chief Walter A. Buel celebrated his fortieth year with the Fire Department of Parsons, Kan., of which thirty-four has been as Chief.

At the time of his affiliation, the department consisted of two men aided by a large staff of volunteers. Now the city has seventeen paid firemen.

Chief Buel is Chairman of Kansas State Fire School Committee—in fact,

Chief Walter A. Buel

he has been Chairman for eight years. He is past-president of the Southwest Firemen's Association. For seven years, Chief Buel served as President of the Missouri Valley Fire Chiefs' Association.

# A thoroughly up-to-date Fire Department—DETROIT—Specifies ROTO-RAYS!

**Seagrave's four enclosed-body pumpers for Detroit are each equipped with BUCKEYE ROTO-RAYS — specified by the Detroit Fire Department.**

**Wherever this apparatus moves, ROTO-RAYS will operate to *clear the way* quicker, and FARTHER AHEAD. Roto-Rays' three powerful, revolving, red signal lights, installed in a commanding position on the trucks, are instantly visible many blocks away, *and cannot be mistaken for anything else on the streets.* When these distinctive signals appear, officers, motorists and pedestrians know at once that apparatus is headed their way. Roto-Rays are FORE-warning signals.**

**Designed for emergency service, Buckeye Roto-Rays are superior in every respect and are guaranteed to give perfect satisfaction.**

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*Fig. 931—Large Type Apparatus ROTO-RAYS*

**Fig. 930, Junior Type ROTO-RAYS, is especially made for Chiefs' cars, ambulances, Police Department Emergency cars and the smaller types of suburban fire apparatus.**

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## FIREMEN'S COAT
***The Finest Money Can Buy!***

Made of Vanitex (tough, waterproof fabric), equipped with the Famous safety snap that can be fastened and unfastened quickly with one hand. These two features continue to give you the finest coat you will ever wear. They are acid-proof, tough, pliable, waterproof and wear like iron. Catalog on request.

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*Manufacturers Since 1870*
ATLANTA ST. LOUIS DALLAS
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**Chief M.:** "I heard about the hot one you had last week and it must have been some fire."

***Chief S.:*** *"It sure was and, being short of men, I'm sure I would have lost it if it hadn't been for those GILSON NOZZLES. They're great nozzles."*

**Chief M.:** "They sure are. I wouldn't part with mine for a thousand dollars if I couldn't get another one. *I've used that WATER CURTAIN, too, and it has helped a lot to reduce my exposure losses."*

# GILSON

## *All Angle* NOZZLE *and* WATER CURTAIN

The nozzle is standard equipment that meets all requirements wherever a 2½" hose line is used. ONE MAN OPERATES IT.

The curtain forms a fan-shaped sheet of water 60' x 20' as a protection against radiant heat.

See these tools in operation and be convinced that they are the most practical nozzles on the market today.

**It Stands Alone!**
***That's Back Pressure Control***

*Agencies available.*

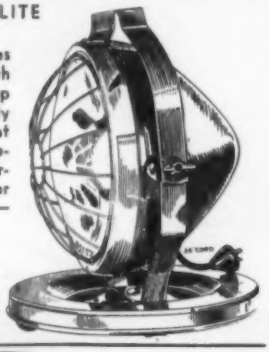
**LOVELL DRESSEL CO., Inc., Arlington, N. J.**

## DIETZ LITES FOR FIRE WORK

DIETZ SPOT, SCOUT OR HOSE LITE

DIETZ PORTABLE FLOODLITE

TWO outstanding Dietz Lites for Fire Departments. Both essential to the speeding-up of night fire work. Both embody the reliability and good looks that have made Dietz lighting equipment for fire fighting famous during several generations. Send for detailed description and prices—including searchlites.



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36 pages. First complete statement of the meaning and causes of fire, and how to extinguish them. Tells all about

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which will control a greater variety of different types of fires than any other extinguishing medium. Tells about our Motor Apparatus Division—our First-Aid Appliances—our Fire-Detecting Systems—our Fire Control Service. You'll enjoy reading it. And you'll understand us better.

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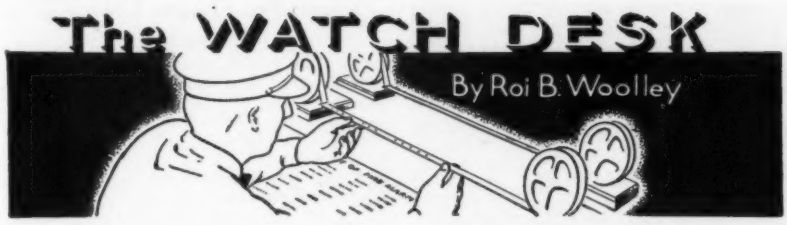


Our inquiring reporter overhauls the firemanic news of the day.

### "Scrub" Firemen

They were going to vote over in Shrewsbury (N. J.), but Chief Edward Obre decided the balloting place, in the fire house, was unclean. He sounded the fire alarm and as rapidly as vol's responded he presented each with mop and pail and put 'em to scrubbing. Voters later cast ballots amid spic-and-span surroundings.

### A Near Cat-astrophy

Firemen of a Westchester (N. Y.) F.D. have a pet cat. One day he, she, or it was missing. Smokeeaters searched to no avail. Just as they quit and listed "Ginger" among the missing an alarm hit in. Away went truck. Upon its return a faint "meaow," was heard seemingly coming from the truck. "What's-at?" said one of the men—"Seems to me it's coming from the hub of this wheel." Putting in his hand he pulled out a limp kitten, crosseyed and with about eight of its nine lives gone from spinning 'round the hub at 40 m.p.h. Last report is "Ginger" is on up-and-up, but steering shy of apparatus.

### Different Kind of Funeral Pyre

Irving W. Johnson, Takoma Park (Md.), sends notice about fire that broke out in coffin in Boyd's Funeral Home, Washington (D.C.). Body of an aged woman, Beatrice Gordon, was awaiting burial with lighted candle on rim of coffin. This jarred into coffin, touched off white satin and a thousand persons watched firemen carry still smoking coffin into street.

### Sad Disappointment for Toronto Fire Fighters

Firemen of Toronto (Ont.) are nursing bitter disappointment. Develops that a phone alarm was received to rush to Russian steam bath. They rushed, only to be met with sign "Ladies Night" on door and obdurate attendant who wouldn't let men enter as place was filled with naked women and, besides, "fire was out." Fire caused by woman hunting ring under furniture with cigarette lighter. Several months ago fire in same building brought firemen, but it was men's night.

### Takes Fifty Firemen to Make Phone-call!

Snow Hill (Md) has a Vol F.D., fifty and more strong. Miss Minnie Henman, telephone operator receives fire calls, operates local siren to warn fire fighters. One night she heard some one trying to open door of telephone exchange. Alarmed, she telephoned police headquarters—got no answer (police force was evidently patroling his beat). Next tried sheriff's home. No luck (mebbe he was out keeping police force company). Further alarmed, she pressed fire alarm button, blasting fifty Vol's out of sweet dreams. They, with police force and sheriff responded, to find the innocent door rattler only wanted to make a long distance call.

### Hot Dogs and Fried Chicken

Twenty-eight blooded dogs of Wilshire Kennels, Chicago (Ill.), were destroyed by fire which wrecked kennels in suburban Hinsdale.

Three thousand chickens, in a large chicken house on estate of Joseph Wilshire, President, Standard Brands, Round Hill, Greenwich (Conn.), perished from fire originating in an incubator. "What's in a name?"

### Firemen Prevent Double Hanging—Queer "Yarn"

This is a yarn about yarn—and two robins. Seems they quarreled over who was to have yarn for nest; entangled in the skein, birds hung by their necks until F.D., summoned by excited sympathizers, arrived with ladders. Extricated robbins were revived and flittered without a chirp of thanks to disgusted truckmen. This from Waukesha (Wis).

### It's the Cat's Whiskers!

Inspector E. G. McDonald (Hamilton, Ont.) recovered from burns and shock of remarkable sequence of events—a cat, a gas chamber and static electricity. Inspector took stray cat to gas chamber at city pound. Cat objected, squirmed and yowled, as McDonald thrust it into gas. Friction in fur created static electricity. Resultant explosion knocked McDonald flat, burned or blew his clothing from body, knocked chamber to pieces. And the cat didn't come back!

### Repercussions of the Fourth

"Hottest" of news of the recent "Safe Fourth" was that concerning Commissioner and Chief John J. McElligott (N. Y. F.D.) famed fire-fighter, whose good work this year resulted in greatly reduced loss of life and property from fireworks in the Big City. Report has it that the Commissioner-Chief, spending the Fourth at his summer home Long Beach (L. I.), attempted to warn his guests away from a piece of burning fireworks but only got himself in the way. Result—lacerated face, rush to hospital, ante-tetanus injection and shock, all of which the Commissioner-Chief took like a spartan, and a fireman!

*

Knoxville, Ia., staged this year's wildest "fireworks" celebration. A section of 30-inch pipe of National Pipe Line Company carrying natural gas from Texas, exploded in field 5 miles out of Knoxville, blew crater 25 ft. deep, 30 ft. in diameter, attracted thousands to the hot "display." Crops—but no lives—were lost.

*

James Giambalbo, 24, a tailor (N. Y. C.), decided to make own "bootleg" fireworks. Ensuing blast ruined apartment in Brooklyn, scared tenants plenty. Giambalbo, badly burned, rushed to hospital, arrested on charge of illegally manufacturing fireworks.

*

Although sale of fireworks was banned in Rochester (N. Y.) five persons were injured by "bootleg" fireworks. . . Many other communities reported casualties from same type of explosives.

*

Prior to the Fourth, Long Island Fireworks Company, Elmont (L. I.), burned, with loss of $15,000 and injuries to five. Explosion set off alarm calling Elmont Vol. F.D., which did noble work.

*

Barclay Warburton, Jr., grandson of late John Wanamaker, nearly lost sight of both eyes in pre-Fourth celebration at Stamford (Conn.).

*

Out in Oroville (Cal.), Town Council decided to use regular $200 appropriation for fireworks instead for relief work projects that would entitle the city to match an appropriation of $800 of Federal funds.

*

Associated Press dispatches report this Fourth's double holiday was celebrated by nation at cost of 444 lives, list being second longest for country's holiday in nine years. Motor vehicle accidents led, with total of 254; accidental drownings numbered 104; *Fireworks Were Responsible For Only 7 Deaths* "despite reports indicating a big scale revival of this traditional feature of Independence Day." The same number were killed from the same cause in 1935, 1933 and 1929. Two deaths occurred in premature explosion of fireworks in boat near Lexington (Mich.) Fireworks started blaze which razed four business blocks in Remsen (Iowa)—damage $500,000.

*

The Old Chief says: "Of what gaineth a community, if it pass laws forbidding sale of fireworks, and its citizenry step across the border and stock up with 'bootleg' explosives!"

**Note to contributors:** If you do not read your news contribution in the next issue of Fire Engineering don't despair—if it's suitable it will ultimately find its way into prior.

**Editor, Watch Desk.**

### WHAT DO YOU KNOW?

**The Editor of "The Watch Desk" welcomes contributions from readers of FIRE ENGINEERING that briefly give facts about interesting, odd things that have to do with fires, fire-fighting, etc. Address "Editor, Watch Desk."**

**Fireman Descends Under the Railroad Trestle**

Pneumatic tools were used to cut away the track ballast so that firemen could get at the seat of the fire below the trestle.

## Sewer Fire Causes $225,000 Damage

Gasoline which was dumped from an oil company plant in San Francisco, and which flowed into a channel sewer, caused a fire which resulted in property damage of $225,000, and gave the firemen a very busy few hours. A warrant has been issued against the oil company for emptying gasoline into the sewer and for maintaining a sump without a city permit.

An employee at the plant of the Richfield Oil Company carelessly left open a valve in a gasoline storage tank, and permitted ten thousand gallons of gasoline to pour onto the ground, down a sump, and into a sewer which emptied into the channel at Seventh Street. The channel passed under the five track wooden trestle of the Southern Pacific Railroad.

As two locomotives passed over the trestle, vapors from the gasoline were ignited by the trains' fire boxes.

With the aid of air operated devices of the railroad, firemen succeeded in cutting through two feet of rock ballast and into the wooden trestle, so that the fire under the trestle could be reached. Firemen wore masks but in spite of this protection, seven were badly burned by fumes from the creosoted timbers.

After the fire was extinguished, workmen of the Southern Pacific removed all the timber from the trestle over a distance of 210 feet, and a three-track width. The entire channel around the wooden sewer was filled in. Wooden caps and stringers were renewed so that the tracks would not bear down directly on the sewer.

Frank Kelly, Fire Marshal, had two warrants issued against the oil company,

**San Francisco Fire Department Prevents the Blaze from Attacking a Lumber Yard**

In the foreground may be seen fire apparatus ready for action, while through the smoke may be seen the stacks and tower of a fireboat.

*One of 20 New Mack Pumpers Delivered to the New York Fire Department.*

PRICES AND ILLUSTRATIONS Catalog of complete line of Hill Bells is yours for the asking.

***New York Fire Department Ordered 20 Mack Pumpers All 20 Were Equipped With***

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# BELLS

ONE of the country's oldest bell manufacturers—and one of the best—was selected by the world's biggest fire department and Mack to supply the bells for 20 new Mack pumpers recently delivered to the New York City Fire Department.

Hill Silvertone Bells are on fire trucks everywhere. Their lasting quality and clear tone has been proven in years of actual service. The one way to be sure of getting the finest of clear tone bells on all your apparatus is to specify HILL Silvertone BELLS—no truck is complete without a bell—no other bells have the lasting tone you get in HILL Silvertone BELLS. When you hear a fire bell think of HILL.

**THE N. N. HILL BRASS CO., EAST HAMPTON, CONN.**

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FIREMEN'S

# BAR CUTTER

**DESIGNED TO SAVE LIVES**

***Cuts Through Iron Bars***

***¾" round or square instantly***

HERE IS A DEVICE that is an absolute necessity in every fire department. Cuts through gratings, barred windows, barred doors, etc. Seven lives were recently saved by our Bar Cutters when rescuers were able to remove the occupants of a wrecked bus only after cutting barred windows with our No. 17 and No. 18 machines.

A Voleske Bar Cutter will pay for itself the first time you use it. It is a genuine life saver. Every Engine house, rescue squad and truck should be equipped with one. You can't buy them at the time you need them—you should get them now.

*Write for our catalog.*

**VOLESKE TOOL COMPANY**

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NOT a female fire fighter but a darn good picture of the weight of

# ALUMINUM LADDERS

***GREATER EFFICIENCY with MAXIMUM SAFETY***

Give your men ladders that will give them greater safety. See and specify Aluminum Ladders. They cost no more than wood and will not burn, warp, rust or break. Never need paint or any other upkeep.

All sizes from 20 to 55 foot extension ladders. For replacements and for that new ladder truck—always specify Aluminum Ladders.

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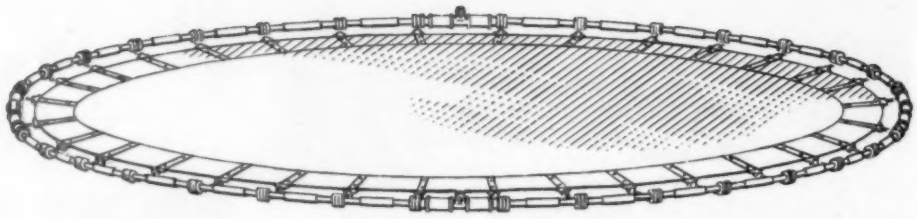
207 WOOD STREET - - - TARENTUM, PENNA.

# ATLAS *The World's Newest and Safest* LIFE NETS



## *Far Superior to Anything You Ever Used*

THERE are hundreds of old life nets in service today that are ready to fall apart. Play safe! Get yourself new life nets—but buy the best you can get—it's cheaper in the long run. The finest, strongest and safest life net made today is the "ATLAS". It is the result of a wide demand for a ***BETTER LIFE NET*** and has been designed and built under the supervision of eminent fire engineers and practical fire fighters and all agree it is way ahead of anything of its kind ever offered the fire field.

**DEALERS**

The increasing demand for ATLAS LIFE NETS makes it necessary to add to our dealers. Write for proposition.

There are two models. One folds in half for use with aerial truck, another folds in quarters for use on all other trucks. Complete information, prices, etc., will be promptly mailed. You owe it to your men, your community and yourself to get the facts on this new and better life net now.

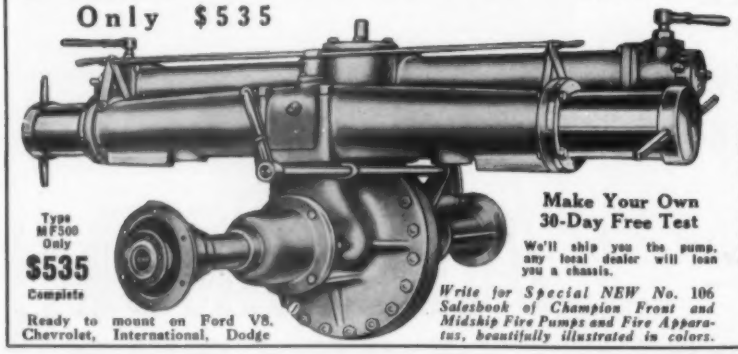
We also manufacture Browder type nets, rope life-saving nets and training school nets.

**ATLAS FIRE EQUIPMENT COMPANY**

22 WARREN STREET : : NEW YORK

# Sensational NEW Midship Champion

**Only $535**



Type MF500 Only **$535** Complete

Ready to mount on Ford V8, Chevrolet, International, Dodge

**Make Your Own 30-Day Free Test**

We'll ship you the pump, any local dealer will loan you a chassis.

*Write for Special NEW No. 106 Salesbook of Champion Front and Midship Fire Pumps and Fire Apparatus, beautifully illustrated in colors.*

A totally new achievement in centrifugal Fire Pump design by Darley engineers.

Weighs only 375 lbs.—specially engineered and built for mounting on 1½-2 ton standard truck chassis without overloading.

Direct drive off chassis propeller shaft. No gears. Simple and dependable. Nothing to go wrong.

Unconditionally Guaranteed for 10 Years.

Meets all requirements of the Underwriters and all State Actuarial Bureaus for 500 GPM Fire Pumps. But actually delivers 600 GPM at suction and 800 GPM from fair hydrants. Automatic Vacuum Primer.

Easily installed without mutilating chassis. Pump fits into the space now occupied by short shaft which connects propeller shaft with transmission. Installation completed in an hour's time.

You can mount the new Champion Midship Fire Pump temporarily on a chassis and make your own tests. If the Champion does not perform fully to your expectations it can easily be removed from chassis and we want you to return it and we will send your money back.

Complete, ready to mount, with Gauges, Booster Valves, etc.

**W. S. DARLEY & CO.**

2810 Washington Blvd. Chicago, U. S. A.

*THE SELLING PLAN OF*

## GOODALL FIRE HOSE

*INVOLVES NO INVESTMENT ON THE PART OF OUR AGENTS*

*Write for details.*

**GOODALL RUBBER CO.**

**PHILADELPHIA**

NEW YORK - PITTSBURGH - CHICAGO
HOUSTON - CLEVELAND
Mills at TRENTON, N. J.

## Bi-Lateral Fire Hose

The one hose that does not require frequent replacements. Always reliable for fire service no matter how old, if the jackets are intact.

Lined with three rubber tubes.

**BI-LATERAL FIRE HOSE CO.**

15 Park Row, New York, N. Y.
20 N. Wacker Drive, Chicago, Ill.

**Scene of the Burning Oil in Channel**

The workman, in this picture, is pointing to the channel sewer. The sewer discharge is indicated by the arrow. At the left of the man's arm is the edge of the Southern Pacific Seventh Street trestle under which the wooden sewer passes.

charging it with violating two city ordinances—for maintaining a sump which dumps into a city sewer, and the other for dumping oil or gasoline into sewers. In addition, the oil company will be sued civilly for the larger part of the $225,000 fire loss. C. W. GEIGER.

## WHAT'S BURNING

THE following list includes fires of $50,000 loss and over in the United States and Canada, for the month of June, 1936. These figures, compiled from the telegraphic reports, are based on estimates made at the time, and are subject to later investigations and consequent revision. Taken as a whole, however, they are an approximately correct view of the losses incurred. The figures represent loss in thousands of dollars.

| Month Ending June 30 | Loss in Thousands of Dollars |
|---|---|
| **Wichita, Kan.**—Bldg. of McClelland Stores Co., damaged | $50 |
| **Portland, Me.**—Summer colony on Peaks Island (Casco Bay) | 80 |
| **Dinuba, Cal.**—Union high school bldg. destroyed | 80 |
| **Bozeman, Mont.**—Nash-Finch Wholesale Co. grocery damaged | 100 |
| **York, Neb.**—School and convent of Ursuline Sisters destroyed | 50 |
| **Lynn, Mass.**—Britt Bros. boat yard | 125 |
| **De Ridder, La.**—Business and residential property | 50 |
| **Port Colborne, Ont.**—Plant of Whitehead Metal Products, Ltd. | 50 |
| **Schenectady, N. Y.**—Two warehouses and bakery property | 400 |
| **Monte Vista, Colo.**—J. C. Penney Co. store damaged | 50 |
| **Hanover, N. H.**—Property of J. Pilver destroyed | 50 |
| **Defiance, Ohio.**—Plant of Defiance Pressed Steel Co. | 850 |
| **Mount Airy, N. C.**—Blizzard Motor Express Co. garage and adj. property | 50 |
| **Louisville, Ky.**—Whse. occupied by Taylor Feed & Grain Co. | 100 |
| **Bowmanville, Ont.**—Taylor skating rink and 78 motor cars | 80 |
| **Cleveland, Tex.**—Mill of South Texas Lumber Co., near Davis Hill | 50 |
| **Brockton, Mass.**—Grandstand on Brockton fairgrounds | 50 |
| **St. Paul, Minn.**—Factory of Rapinwax Paper Co. | 80 |
| **Martinsville, Va.**—Several business establishments | 50 |
| **Bakersfield, Cal.**—Producers' Oil refinery damaged | 80 |
| **Union City, Tenn.**—Plant of Model Flour Mill destroyed | 180 |
| **Norton, Va.**—Norton Hotel damaged | 80 |
| **Picayune, Miss.**—Plant of Goodyear Yellow Pine Co., destroyed | 210 |
| **Jenkins, Ky.**—Business and residential property | 50 |
| **Bismarck, N. D.**—Armour Creameries damaged | 100 |
| **Talladega, Ala.**—Freight depot of Atlanta, Birmingham & Coast R. R. | 50 |
| **Winnfield, La.**—Sawmill of Mansfield Hardwood Lumber Co. | 80 |
| **Glendale, Cal.**—Plants of Kormann Laboratories and Industrial Plating Co. | 80 |
| **Houston, Tex.**—Business property | 80 |
| **Medford, Wis.**—Plant of Hurd Millwork Corp. | 500 |
| **West Nashville, Tenn.**—Jakes Foundry Co. bldg. | 50 |
| **Kansas City, Mo.**—Mayfair Night club destroyed | 170 |
| **Brantford, Ont.**—Plant of Avey Lumber Co. destroyed | 80 |
| **Carrollton, Ky.**—Whse. of R. M. Barker Tobacco Co., destroyed | 170 |
| **Dunsmuir, Cal.**—Commercial garbage destroyed | 50 |
| **Linville, N. C.**—Esceola Inn, owned by Linville Impr. Co. | 50 |

## Arson Is on the Decrease

The crime of arson in the United States has decreased about fifty per cent since 1931 according to the annual report of the Committee on Arson and Incendiarism of the National Board of Fire Underwriters for the year ended April 30, 1936. The report, a printed document of nine pages, surveys the arson situation generally and emphasizes that the work of the Arson Committee and its agents in the U. S. is becoming more fruitful each year.

Not alone were crooked fires down in number during the year 1935, but there was a marked lessening in the number of fires by organized or professional gangs of criminals, the report declares. Success in rounding up organized arsonists has not alone ended the operations of these bands but has acted as a deterrent on newly formed gangs. Public interest in criminal investigations and prosecutions by federal agents in their relentless war on racketeers, has done much, the report avers, to thwart those bent on incendiarism. While the work of Uncle Sam's "G" men and their related agencies is not specifically directed against arson activities, it has nevertheless, with its attendant publicity in the press, the movies and on the air, tended toward better law enforcement.

The report dwells at some length on the work of the Crime Committee appointed by the Governor of New York and the findings of the Committee and its recommendations to the Legislature. There has also been substantial increase in the interest displayed by prosecuting attorneys throughout the country. It points out that the Arson Committee in its survey found that "at no time have there been so few offices of the type of state and city Fire Marshals occupied by inefficient or inactive men."

The report gives much praise to the work and the accomplishments of the agents employed by the Arson Bureau of the National Board of Fire Underwriters. Last year these men reported on 2,657 fires of alleged incendiarism. This is 147 less than the number of reports made during the previous year. The number of arrests is lower too—lowest in eight years, but the acquittals were also the lowest in eight years. Arson conditions in New York and its environs "have continued to be excellent" the report says. This is equally true of Chicago.

In Seattle, Wash., from 1931 to 1935, one man was confessedly responsible for 140 fires involving insurance of $5,000,000 and a loss of $751,501.60. That man was sent to jail for five years.

A model arson law now is in effect in thirty-six states. In other states, such as New York, recent legislation was enacted to conform to the National Board's ideas of what a model arson law should contain.

The report expresses the appreciation of the Committee on Arson and Incendiarism for "the very fine service" of Messrs. Bielaski, Donovan, Blanford and their assistants. It also mentions the committee's thanks to municipal and state officials generally for their cooperation and support of the aims of the committee. The report is signed by Harold Warner, Chairman of the committee, whose office is in New York.

WM. JEROME DALY.

## Ohio Volunteers Hold Convention

The sixth annual convention of the Central Western Ohio Volunteer Firemen's Association was held at Piqua, June 24. A special ladder drill was staged by a crew from the Cincinnati Fire Department. Following the meeting, there was a parade in the afternoon, and a dance in the evening.

## Sandhill Firemen Meet

Firemen of the Sandhill Association closed their annual meeting at Lumberton, N. C., with a beauty contest and dance after election of officers. The 1937 meeting will be held at Sanford.

Officers elected are R. B. Lemond, Sanford, President; L. S. Rowell, Southern Pines, Vice-President; Fred W. Deal, Fayetteville, Permanent Secretary.

Sherwood Brockwell, State Fire Marshal of Raleigh, urged firemen to know the buildings of their own, eliminate fire hazards, and demand legislation for their own protection. Other speakers included Dr. Will S. Long of Graham, President, and John L. Miller of Concord, Secretary of the State association.

D. G. SPENCER.

New York Fireman's Certificate of Henry T. Gratacap, Founder of Cairns & Brother

## Helmet Makers Celebrate 100th Anniversary

Carefully preserved in the office of Cairns & Brother, now located at Lafayette Street and Astor Place, New York, is a certificate dated 1829, testifying to the fact that Henry T. Gratacap "is one of the firemen of the City of New York." Those were the days of watch towers, leather buckets and hand pumpers, when firemen wore high hats of felt and paper or "leathern caps." The firemen of the New York City Volunteer Department were ordered to wear leather "caps" as early as 1813. The purpose of the cap was to designate their membership in the department, but Mr. Gratacap soon saw the necessity for something that would give protection as well.

In 1836 he set up a small shop at Broadway and Walker Street, New York, for the purpose of manufacturing firemen's helmets, and thus founded the business which is now, and has been for many years past, known as Cairns & Brother.

Search of early records indicates that one Jacob Turk made a "leathern fire cap" as early as 1740, but Mr. Gratacap is credited with being the first to make the hardened leather fire helmet with enlarged brim, and also with being the first to decorate the helmet with the brass eagle head, a style which is traditionally known as the American Regulation. The fundamentals of his design are found in the most popular models of today though many innovations have in the meantime been tried. The demand for this helmet grew, soon making larger quarters necessary, and when Mr. Gratacap moved to 143 Grand Street in 1850, his friends freely predicted that to go so far "up-town" would be ruination. On the contrary his business prospered, and in 1869 he sold out to two Cairns brothers, Jasper and Henry. They in turn were succeeded by two more Cairns brothers, Edward and Irving. Irving survives and, at 84, is still active in the business. His successor is a son, Edward, and associated with the firm for nearly 50 years is a nephew of Irving, Walter.

The firm name Cairns & Brother remained unchanged and is favorably known to firemen of the U. S. A., Canada and many foreign countries. Their entire career has been devoted to the manufacture of firemen's equipment, specializing in helmets and while the business never reaches large proportions (mainly because of the long life of the product), the firm's record of continuous operation for a century is a tribute to their product and their method of doing business.

The trade-mark of the firm is a fireman striding through flames, with trumpet held aloft and a child in his arms. Standing in the firm's office is a wooden statue of this trade-mark three feet high, wearing a miniature helmet with his breast adorned by a solid gold badge. The figure was hewn from solid oak by an old carver of figure heads for sailing vessels in old times. This man, whose name is not known, was one of a group of volunteer firemen who for many years came daily to the old Gratacap shop and spent hours in talk, playing cribbage and smoking. An interesting reference to this group is found in an early history of the Volunteer Fire Department of the City of New York: "A certain place in Grand Street, neither a cigar store nor a rum shop, where fire laddies were wont to congregate," said Mr. Gratacap, "and blow fire-talk from daylight until ten at night. I gave them tobacco and water, but no liquor."

Irving Cairns
Manufacturer of Firemen's Equipment for 63 Years

Walter E. Cairns

## Texas Firemen Meet

Chief R. R. Talbert, Mercedes, was elected President of the Texas Firemen's and Fire Marshal Association, at the convention held at Fort Worth, June 9 to 11. The other officers are Lew Haynes, San Marcos; G. E. Daton, Coleman; Frederik Kloy, Taylor, vice-presidents, and Elin Culberson, secretary-Treasurer.

H. R. Brayton, Director, State Firemen's Training School at the A. & M College, said in his talk that Fort Worth has one of the best trained departments in the state.

## Schrage Again Honored by Iowa Firemen

H. C. Schrage, Waterloo, Ia., was reelected President of the Iowa Association of Fire Fighters, at a convention held at Ottumwa. The other officers are C. E. Chappelle, Sioux City, First Vice-President; Melvin C. Thompson, Cedar Rapids, Second Vice-President, and William Hottel, Des Moines, Secretary-Treasurer. The 1937 convention will be held at Burlington.

The association is pushing legislation to protect operators of fire apparatus, against damage suits in case of accidents. It also asks that firemen be exempt for payment of the old-age pension tax.

# Modernize with— WARD LAFRANCE

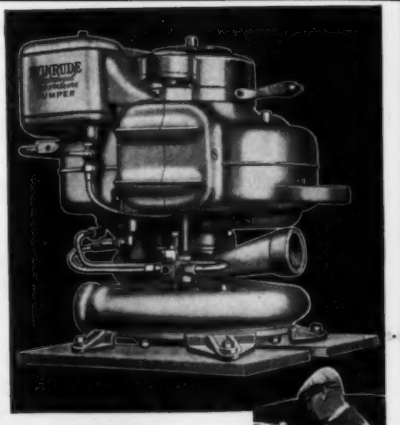
BRING your Fire Department's fighting strength up to where it should be. Ward La France apparatus is the last word in modern Fire Fighting efficiency. It is the kind of apparatus you will be proud to own. Pumpers from 350 to 1000 gallons per minute, Ladder Trucks, Hose Wagons, and special emergency trucks. Ward La France equipment is also mounted on selected Chassis of other makes. Complete information upon request.

**WARD LAFRANCE TRUCK CORPORATION, ELMIRA, N. Y.**

CHECK THIS STATEMENT
THERE NEVER WAS ANYTHING MADE BUT SOMEONE COULD MAKE IT WORSE AND SELL IT FOR LESS
DOUBLE CHECK AND BUY FROM A PERFECTED AND COMPLETE LINE
AKRON BRASS MFG. COMPANY, INC.
WOOSTER, OHIO

UP TO **154** Gals per Min.

UP TO **150** lbs. Pressure



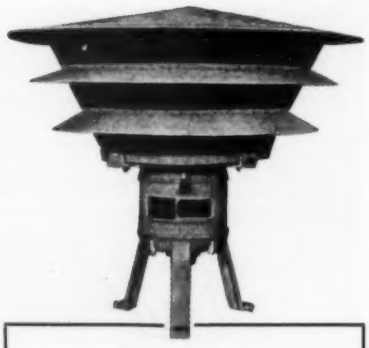
## FIRE FIGHTING

High capacity with high pressure. Write today for complete performance tables and specifications on this newest type, smooth running, four cylinder Evinrude Fire Fighter. Develops 9.2 H.P. at 4000 R.P.M. Latest, modern, hooded power type motor. Sand and other foreign substances handled without wear by simple, non-friction, centrifugal pump of exclusive Evinrude design. Write EVINRUDE, 4586 N. 27th St., Milwaukee, Wis.

**EVINRUDE** HIGH PRESSURE **PUMPER**

# The ERICK FIRE ALARM SIREN

***The Simplest, Most Dependable Siren for the Small City or Volunteer Town***



HERE is a siren any town could well be proud of. It is loud enough to wake up the sleepiest volunteer. Every part of the ERICK SIREN is made with the utmost care. We aim to build a siren that will give unfailing, dependable care-free service for a lifetime. Every ERICK SIREN is weather proofed. It needs oiling but once a year, no further attention is needed. The ERICK is easily and quickly set up and connected by any local electrician. It can be operated by push button from telephone headquarters and from various points in the village. Its first cost is the only cost. It uses current only when sounding. Its loud wail is instantly recognized as the fire signal—bringing volunteers out instantly. Read our free trial offer and see for yourself how easy it is to get this necessary protection for your town.

**MARTHALER MACHINE & ENGINEERING CO. Inc.**

78 STATE ST., ST. PAUL, MINN.

*Northwest Distributor* W. S. NOTT CO. *Minneapolis, Minn.*

***Chief—***

***We want you to try out the* ERICK *for* 30 DAYS *or longer. We want you to prove it* BEST *by* TEST *in your own town. No expense—we take care of that. Just write us!***

# SMOKE EFFECTS

**FOR TRAINING FIREMEN**

***Used By Leading Fire Departments***

EVERY Chief should take proper precaution to safeguard the lives of his men and to protect them from unnecessary accidents. Training the men to go through smoke that simulates the conditions present at real fires is a training to safeguard the men against accident and possible death.

**NEWMAN SMOKE EFFECTS**

have been found most satisfactory and re-orders have proven their practicability. They can be had in yellow, black or white. We recommend the yellow and black for all-around use.

There is only ONE way to buy these—write direct to us or use the handy coupon below for trial offer. Regular EFFECTS are $5 per dozen for yellow or white; Giant Black—$10 per dozen. Lower prices for quantities.

**$5.00** per dozen F.O.B. New York

I. C. NEWMAN CO., Inc.
6 East 45th St., New York

Please send us ( ) dozen smoke effects. We enclose check for $.....

Send complete information.

NAME .....

POSITION .....

ADDRESS .....

# HEWITT-GUTTA PERCHA FIRE HOSE

A complete line, including
Wax Treated - Solid Multiple Woven
AND
Single and Double Jacket Hose

Manufactured by
**HEWITT RUBBER CORPORATION**
BUFFALO, N. Y.
*"Territories Available"*

# CRACKERJACK FIRE HOSE

**The hose with an unsurpassed reputation for QUALITY and SERVICE that has made it the STANDARD OF THE WEST for over 25 years.**

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COMPLETE INFORMATION UPON REQUEST

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THE AMERICAN RUBBER MANUFACTURING CO.
OAKLAND, CALIFORNIA
*Dealers in All Parts of the Country*

## Southeastern Chiefs Elect Dowling

Chief W. Q. Dowling, Jacksonville, Fla., was elected President of the Southeastern Association of Fire Chiefs, at the annual convention held at the Ansley Hotel, Atlanta, Ga., on May 4 and 5. The meeting was held in conjunction with the Georgia State Fire College.

Besides Chief Dowling, the officers are Chief O. J. Parker, Atlanta, Ga., First Vice-President; Chief C. M. Johnson, Knoxville, Tenn., Second Vice-President; Chief R. S. Baughan, Norfolk, Va., re-elected Secretary-Treasurer. The new President will represent the section at the Executive Committee meeting of the I.A.F.C. at Toronto, Ont.

The following topics were presented:

"Fire Department Traffic Problems," Chief C. H. Johnson, Knoxville, Tenn.

"Problems of Small Town Fire Departments," Chief Floyd C. Pfaender, Winter Haven, Fla.

"Cotton Fires," Chief V. C. Shepard, Macon, Ga.

"Harbor and Waterfront Protection," Chief W. Q. Dowling, Jacksonville, Fla.

The State Vice-Presidents are Alabama, C. L. Ingram, Montgomery; Florida, Floyd C. Pfander, Winter Haven; Georgia, D. W. Brosnan, Albany; Kentucky, Lee Roberts, Fulton; Mississippi, Sam Bellipanium, McComb; North Carolina, Lon Duckett, Asheville; South Carolina, H. B. Wells, Newberry; Tennessee, Ross H. Bridges, Knoxville; Virginia, E. H. Rouse, Orange; West Virginia, T. A. Gilmer, Huntington.

The 1937 convention will be held at Albany, at a date to be decided later.

## Electrical Fire Prevention Men Meet

A meeting of electrical experts in the field of fire prevention was held in the offices of the Underwriters' Laboratories, New York City, June 16 and 17.

One of the subjects discussed was the spread of air conditioning installations. Reports were presented on field service records of armored cable, flat irons and motion picture machines. Some attention was given to paper linings for lamp sockets, and the insulation of fixture wires.

## Two-Way Radio Communication

The Charlotte, N. C., Fire Department has successfully demonstrated the practicability of two-way radio operation.

A transmitter built in Chief Hendrix Palmer's car operates on high frequency between five and ten meters with power output at about twelve watts. T. C. Wood, Chief Radio Operator for Charlotte, designed and built the set that was used.

With a small microphone near the driver's seat and the transmitter in the trunk on the rear of the machine, Chief Palmer and Radio Chief Wood talked with officials at headquarters, and in return received communications.

The broadcasting was termed an experiment, but officials are convinced it will prove of much value to Fire and Police Departments.

It is said that the calls in the test were clearly received at the fire stations of the city, and two-way conversation carried on without interference of any kind.

D. G. SPENCER

## Connecticut Firemen to Meet

The fifty-third annual convention of the Connecticut State Firemen's Association will be held in the Auditorium of Havemeyer School, Greenwich Avenue, Greenwich, Conn., on Friday and Saturday, August 21 and 22.

The headquarters of the Executive Committee will be at Fire Headquarters where a meeting preliminary to the opening of the convention will be held on Thursday, August 20 at 4 p.m. A parade of old time fire apparatus will be held on Saturday, following the conclusion of the business for the year.

THOMAS F. MAGNER.

## Minnesota Firemen Meet

Over five hundred persons attended the sixty-fourth annual convention of the Minnesota State Firemen's Association held at Caledonia, June 8-10. A new state fire chiefs' association was formed.

The new chiefs' group is headed by Frank Fuller, Brainerd, and Chief Murphy of Caledonia is Secretary-Treasurer. A committee has been named to draft a set of by-laws and a constitution.

Dewey W. Johnson, Deputy State Fire Marshall; Harry Peterson, Minnesota Attorney General, and Earl W. Traeger, Chief, Minneapolis Fire Department, spoke at the firemen's meetings.

The firemen elected William J. Luedke, White Bear Lake, President, and Fred Pfander, New Ulm, Secretary. Chief Murphy, Caledonia, was elected Vice-President and W. T. Berry, Wayzata, Treasurer.

## Love's Labor Lost and Burned

Circumstantial evidence at Jacksonville, Fla., convicted a negro who had set fire to the house in which lived his sweetheart and nine other persons.

The negro became angry with the girl one evening and later that night he tried to gain entrance. When he failed, he poured kerosene around the front of the house and set fire to it.

Asst. Chief A. W. Dopson, who arrived with the companies, detected the odor of kerosene and immediately notified the Fire Marshal. He secured enough circumstantial evidence to convice the suspect, who was sentenced to ten years at hard labor.

D. G. AID.

## Chief Palmer Plans Drill Tower

Believing that the legal way is clear, Chief Hendrix Palmer will request City Manager J. B. Marshall to devise means for construction of a drill tower for use of his department.

Returning from Wilmington, N. C., where he attended a drill school, Chief Palmer declared that Charlotte is far behind other cities in the state in the training of firemen for their work.

He said he would write Mr. Marshall immediately, and make an official request for the establishment of the tower, which, it is believed, can be built for close to $20,000.

Several years ago an effort was made to secure a tower for Charlotte, but an adverse court decision intervened. The assumption was then that the drill tower was not a necessity. Chief Palmer explained that the high court held that the previous Council was in error in not having stated the tower was a necessity.

D. G. SPENCER.

## Clean Sweep for Laundry

Only the walls remain of a laundry building in Minneapolis, Minn., which was swept by a three-alarm fire on a Sunday afternoon. The building was two stories high, 100 feet long, constructed of brick and tile. Fire started at the rear and quickly ate its way through the roof.

Firemen used deluge sets and turret pipes to extinguish the fire. Damage was estimated at $50,000.

## Chief Marsh No Horse Trainer

After a brief call at a local hospital, Chief A. McC. Marsh, Columbia, S. C., is convinced that there are some types of horses that cannot be adapted to Fire Department work.

As part of the sesqui-centennial to celebrate the founding of the city on the banks of the Congaree, a 30-year-old hose cart was to be drawn through the city. A horse was borrowed from an ice company and the Chief decided to take a trial ride before the official parade. The horse, becoming excited at the clang and clatter of the hose rig, dashed past a red traffic light and the wagon crashed into two parked automobiles. Chief Marsh and a fireman were treated at a hospital for scratches and bruises. The right side of the hose cart was splintered.

The cart was repaired at once, a different and more docile horse borrowed from the ice company, a new driver was coached, and everything was ready for the big parade that afternoon.

D. G. SPENCER

## Cause of the Morro Castle Disaster

(*Continued from page 294*)

for thought. It is this: Can a jury made up of laymen not familiar with even the rudiments of navigation, reach as sound a verdict as one comprised of men fully informed on the subject?

In some European countries ship captains are tried before juries made up of men who are their peers. The same procedure is followed in our Army and Navy, when officers are on trial.

Would Captain Warms of the "Morro Castle," who lived up to the finest tradition of the sea, who held his post until the deck plates buckled beneath his feet, and who was the last to be taken off the ship, have been convicted of neglect, had he been tried by men who were fully informed of the work and responsibilities of a ship's master?

## Fire Service More Hazardous Than Police

During the year ending June 30, 1934, according to a report by the Bureau of Labor Statistics, United States Department of Labor, a total of 5,986 Fire Department employees received disabling injuries—that is those serious enough to cause absence from duty—in the 363 cities which supplied information on this point. (See accompanying table).

**Number of Fire Department Employees in 363 Cities with a Population of 25,000 or Over Injured During the Year Ending June 30, 1934**

| Size of city | Total number of employees | Number of employees injured | | |
|---|---|---|---|---|
| | | Total | Fatal | Nonfatal |
| All cities | 60,090 | 5,986 | 81 | 5,905 |
| Cities of 1,000,000 or more | 15,007 | 1,729 | 13 | 1,716 |
| Cities of 500,000 and under 1,000,000 | 7,981 | 1,018 | 7 | 1,011 |
| Cities of 250,000 and under 500,000 | 10,243 | 1,265 | 10 | 1,255 |
| Cities of 100,000 and under 250,000 | 10,696 | 996 | 24 | 972 |
| Cities of 50,000 and under 100,000 | 8,532 | 513 | 13 | 500 |
| Cities of 25,000 and under 50,000 | 7,631 | 465 | 14 | 451 |

As the total number of employees in the cities for which information was available was 60,090, approximately 1 out of every 10 employees suffered a disabling injury during the year. *This is about 50 per cent higher than the accident rate reported for Police Department employees.*

Curiously enough the accident rate was highest in the smaller cities. The table shows that in cities with a population of less than 100,000 the accident rate was nearly double that in cities of 500,000 or over. This may be due to better equipment and higher standards of training in the larger cities, although difference in type of building construction is probably a major factor contributing to the difference.

Of the 5,986 disabling injuries reported for the year, 81 were fatal. With respect to fatalities also the smaller cities have the worst records. Nearly a third of the fatalities were accounted for by the cities with a population of between 100,000 and 250,000. The cities with a population of less than 100,000 accounted for another third of the fatal accidents. On the other hand, the cities with a population of over 500,000, although accounting for more than 38 per cent of the Fire Department employees covered, reported only 20 fatalities during the year.

**One Type of Accident Not Often Included Under the Head of "Injuries"—Gassing**

The after-effect may have a material bearing on the life span of the victim. The above illustration shows five of eleven firemen knocked out at a fire in New York City on March 16, 1936.

## Ex-Chief Edward A. McGranahan Dead

Edward A. McGranahan, former Chief of Wheeling, W. Va., died at Steubenville, Ohio, at the age of fifty-four, while participating in a parade that was part of the convention of the Ohio Fire Chiefs' Association. His death came as a great shock to his many friends who were attending the state convention.

As the parade passed the post office, Chief McGranahan and several other delegates had fallen into line behind a motorcycle officer. The Chief had marched about four blocks when he was stricken and fell. He was rushed to a hospital but first aid efforts were futile.

The late Chief came to Steubenville as a guest of Chief Green of that city.

Chief McGranahan was one of the oldest honorary members of the association.

He was born in Wheeling June 30, 1882, and joined the Wheeling Fire Department in 1905. In 1922 he was appointed Chief. He retired in 1933.

**The Late Chief E. A. McGranahan**

During the Ohio river flood of the past March, the Chief had engaged in much relief work, and it is believed that he may have overtaxed his strength during the emergency.

He was a Mason, member of the B.P.O.E., and the Civitan Club.

## Chief Nancy Allen to the Rescue

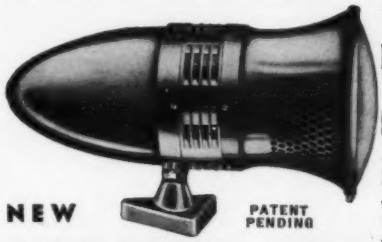
Chief Nancy Allen, well known Rhode Island Fire Chief, and perhaps the only woman to hold such a position, rescued five men who were trapped by burning brush in the Hillsgrove section of Warwick, R. I.

The plight of the men was discovered by an aviator. He flew his plane over the spot to attract attention to the trapped men. With the aid of twelve men of her own companies, and Chiefs Fred Brown and George Long, of neighboring companies, the men were dragged out of the danger zone and given first aid by Chief Allen.

This twenty-eight-year-old Chief established her own unit because of spring and fall fires on the 1,000-acre woodland estate of her family at Cowessett. Her apparatus also carries a portable pump, has a floodlighting system, carries emergency tools and first aid equipment, and is commonly called whenever there are drowning accidents in Narragansett Bay.

## Gases, Chemicals and Hazardous Materials

**Owing to the large number of special articles in this issue it has been found necessary to omit the installment of the series on "Gases, Chemicals and Hazardous Materials." This series will be resumed in the August issue.**



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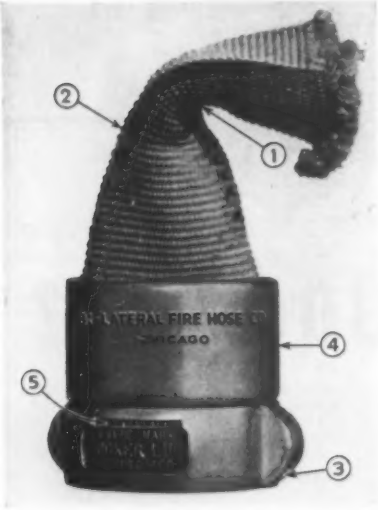
## Manufacturers' Announcements

### Bi-Lateral Fire Hose

Bi-Lateral Fire Hose Company, 20 North Wacker Drive, Chicago, Ill., has announced improvements in construction




Bi-Lateral Hose Improvement

of fire hose. The new hose has a three-sheet tube, which is cemented for a predetermined distance back of the coupling, entirely around its periphery. The makers claim that this improvement will protect the tube from the kick occurring where hose is attached to engines, on a straight angle, instead of the angle elbow.

### Elkhart Brass Manufacturing Company

Catalogue F has been issued by the Elkhart Brass Manufacturing Company, Elkhart, Ind., to present their general line of nozzles and other brass goods.

### Rockwood Sprinklers

A twelve-page illustrated catalogue has been issued by the Rockwood Sprinkler Company, 38 Harlow Street, Worcester, Mass., to describe Rockwood sprinkler installations. The booklet bears the title "12,000,000 Rockwood Sprinklers."

### Garrison Fire Extinguishing Method

A 36-page illustrated catalogue has been issued by the Garrison Engineering Corporation, Great Barrington, Mass., to describe the dry method of fire extinguishment. The reading matter is prepared in the form of questions and answers, and describes the extinguishers, and the method of using.

### Distribution of Fog Nozzles

Arrangements have been made by the Fog Nozzle Company, Los Angeles, Cal., with the Elkhart Brass Manufacturing Company, Elkhart, Ind., whereby the latter company will handle the sales of the Fog Nozzles in the territory east of the Rocky Mountains. The distributor on the West Coast is the Sanderson Safety Supply Company, Seattle, Wash.

### Smoke Flares

A variety of smoke flares is being manufactured by I. C. Newman Co., 6 E. 45th Street, New York City, for use in instructing firemen. They are used for special smoke effects at training schools and in smoke towers where firemen receive instruction.

### Universal Meter

Mohawk Electric Manufacturing Company, Newark, N. J., have an illustrated folder to describe the No. 9 Universal Meter. This meter, which weighs five pounds, is designed to test fire alarm box lines, rectifier boosters, lighting circuit, ground test on fire alarm lines, etc. The company makes municipal fire alarm specialties.

### Pyrene Devices

An illustrated folder has been issued by the Pyrene Manufacturing Company, Newark, N. J., to describe the Phomaire playpipe and the Phomaide solution for delivering foam to fires. The solution tank is carried on the back of a fireman, and the solution mixes with water delivered by the hose line to the special playpipe to form foam.

### Improvements in Gas Mask Face Pieces

Patents have been granted to the E. D. Bullard Company, San Francisco, for improvements in gas mask face pieces. Molded from a single piece of rubber, they are built to fit the shape of the face. The makers claim that there is twenty per cent lower breathing resistance with the new exhalation valve made of a plastic material that is considered to have the strength of aluminum.

The valve is fastened in the center of the facepiece, and the opening for the release of breath, is around the circumference of the valve.

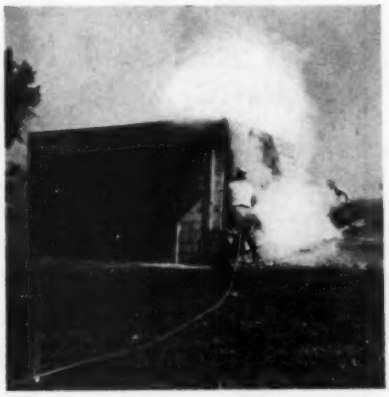
Gas Mask Face Piece

### Portable Fire Pump

Information is being mailed by D. B. Smith & Co., Utica, N. Y., regarding No. 90 Indian fire pump. The water tank, which is carried on the back, is form fitting and ventilated to prevent moisture from reaching the back of the wearer. The appliance has a seamless brass pump, with brass plunger. The tanks have heavy solid brass bottoms to prevent rusting.

## DuGas Tested at Minneapolis

Two hundred fire department officials of Minneapolis, St. Louis and surrounding towns, witnessed a demonstration of the DuGas method of extinguishing fires, conducted at Minneapolis by Lodias Dugas, President, Diener-DuGas Company. He was assisted by R. E. Davis, General Manager of the company.



Fire in Test Shack Extinguished by DuGas

The fire apparatus was assembled by Peter Pirsch & Sons, Kenosha, Wis.

## Camden Host to S. C. Firemen

After selecting Charleston by unanimous vote as the next meeting place, the South Carolina State Firemen's Association closed its thirty-first session held at Camden, June 10 and 11. No new officers were elected this year as the present officers elected hold office for four years.

At the business session the association voted to do away with the firemen's school held in Columbia each year.

The Convention was called to order by President A. C. Marsh, Columbia. Mayor J. H. Osborne welcomed the 321 members who attended the convention.

Addresses were delivered by K. C. Billings, Lancaster; Sam King, State Insurance Commissioner; R. M. Kennedy, Jr., former president of Fire Insurance Agents Association.

Senator S. F. Brasington introduced Mayor B. R. Maybank, Charleston, who made the principal address of the day. Memorial exercises were held for departed members. D. G. SPENCER.

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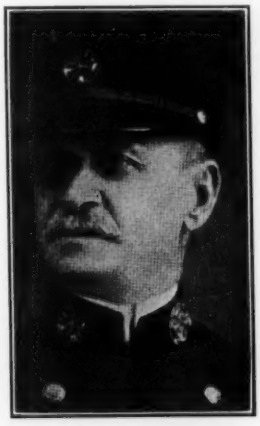

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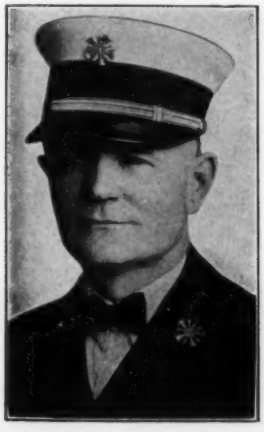

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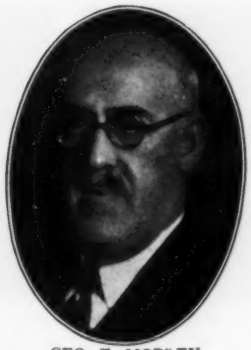

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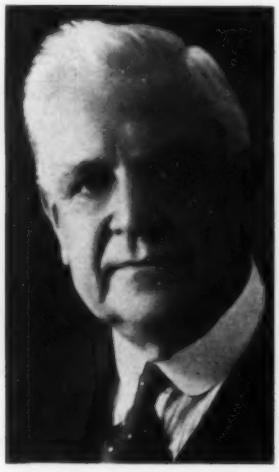

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## CONVENTION DATES

July 13-16—FLORIDA STATE FIRE COLLEGE. 7th Annual College, Daytona Beach, Fla. General Manager, Chief J. F. MacMillan, Cocoa, Fla.; Secretary, Chief F. C. Pfaender, Winter Haven, Fla.

July 17-18—HUDSON-MOHAWK VOLUNTEER FIREMEN'S ASSOCIATION. Annual Convention, Renssalaer, N. Y.

July 19—REGIONAL FIRE SCHOOL. Little Falls, Minn.

July 20-23—PACIFIC COAST ASSOCIATION OF FIRE CHIEFS. 48th Annual Convention, Seattle, Wash., Secretary, Jay W. Stevens, Merchants' Exchange Bldg., San Francisco, Cal.

July 22—NASSAU COUNTY FIREMEN'S ASSOCIATION. Regular Quarterly Meeting, 8:30 p. m., Fire Headquarters, Sea Cliff, L. I., N. Y. Secretary, James McInnes, Jr., Syosset, N. Y.

July 27-30—WEST VIRGINIA FIRE SERVICE EXTENSION SCHOOL. 6th Annual School, West Virginia University, Morgantown, W. Va. Director, D. L. McElroy, at the University.

July 27-Aug. 1—UPPER PENINSULAR FIREMEN'S ASSOCIATION. Annual Convention, Negaumee, Mich.

July 28-31—INTERNATIONAL ASSOCIATION OF FIRE CHIEFS. 64th Annual Convention, Hotel Royal York, Toronto, Ont. Recording Secretary-Treasurer, Ex-Chief James J. Mulcahey, 16 Franklin Ave., Yonkers, N. Y.; Chairman, Exhibit Committee, Chief Roy B. Mottesheard, Dearborn, Mich.

Aug.—CENTRAL DISTRICT FIREMEN'S ASSOCIATION. Annual Convention, one week, date to be announced later. Secretary, Gilbert Coble, P. O. Box 366, Punxsutawney, Pa.

Aug.—UTAH STATE FIREMEN'S ASSOCIATION. 36th Annual Convention, Ogden, Utah. (Exact date to be decided later.) Secretary, John J. Creedon, P. O. Box 25, Bingham Canyon, Utah.

Aug. 4-6—WISCONSIN PAID FIREMEN'S ASSOCIATION. 29th Annual Convention, Waukesha, Wis. Secretary, William Schultz, Sheboygan, Wis.

Aug. 10-13—NORTH CAROLINA STATE FIREMEN'S ASSOCIATION. 49th Annual Convention, Hotel Sir Walter, Raleigh, N. C. Secretary, John L. Miller, Concord, N. C.

Aug. 11-12—CUMBERLAND VALLEY VOLUNTEER FIREMEN'S ASSOCIATION. 35th Annual Convention, Martinsburg, W. Va. Secretary, C. L. Jacobs, Waynesboro, Pa.

Aug. 11-13—INDIANA FIREMEN'S ASSOCIATION. 20th Annual Convention, Terre Haute, Ind. Secretary, Burley Marshall, P. O. Box 725, Terre Haute, Ind.

Aug. 11-14—STATE FIRE CHIEFS' ASSOCIATION OF VIRGINIA. 8th Annual Convention, Norfolk, Va. Secretary, Chief E. H. Rouse, Orange, Va.

Aug. 11-14—VIRGINIA STATE FIREMEN'S ASSOCIATION. 50th Annual Convention. Norfolk, Va. Secretary-Treasurer, O. B. Dabny, Staunton. Va.

Aug. 15—FIRE CHIEFS' EMERGENCY PLAN. Mid-Summer Outing and Clambake, Chief McGuire's Hotel, Washington Avenue, Peekskill, N. Y. Secretary, Walter M. Dawkins, P. O. Box 241, Port Chester, N. Y.

Aug. 17—VERMONT STATE FIREMEN'S ASSOCIATION. 46th Annual Convention, Rutland, Vt. Secretary-Treasurer, W. H. Adams, Vergennes, Vt.

Aug. 17-20—CALIFORNIA STATE FIREMEN'S ASSOCIATION. 14th Annual Convention, Lodi, Cal. Secretary-Treasurer, H. E. Strasser, 1171 Tenth Ave., San Diego, Cal.

Aug. 18-21—FIREMEN'S ASSOCIATION OF STATE OF NEW YORK. 64th Annual Convention, Tonawanda, N. Y. Secretary, Fred A. Davis, Fort Edwards, N. Y.

Aug. 21-22—CONNECTICUT STATE FIREMEN'S ASSOCIATION. 53rd Annual Convention, Greenwich, Conn. Secretary, D. W. Harford, 10 Chestnut Street, South Norwalk, Conn.

Aug. 26-28—DOMINION ASSOCIATION OF FIRE CHIEFS. 28th Annual Convention, Windsor, Ont. Secretary, Chief James Armstrong, Kingston, Ont.

Aug. 27-28—NEW YORK AND PENNSYLVANIA FIREMEN'S ASSOCIATION. 2nd Annual Convention, Elmira Heights, N. Y. Secretary, General Convention Committee, Elmira Heights, N. Y.

Aug. 29—INDIANA STATE FIRE CHIEF'S ASSOCIATION. Annual Convention, Logansport, Ind. Secretary, Chief Archie McCabe, Muncie, Ind.

Aug. 31-Sept. 3—NATIONAL MUNICIPAL SIGNAL ASSOCIATION. 41st Annual Convention, Hotel Pennsylvania, New York City. Secretary, W. H. Harth, Columbia, S. C.

Sept.—MISSOURI STATE FIREMEN'S ASSOCIATION. Annual Convention, Mountain Grove, Mo.

Sept. 15-16—IOWA STATE FIREMEN'S ASSOCIATION. 59th Annual Convention, Hotel Winchester, Eldora, Ia. Secretary, Paul A. Sogner, Independence, Ia.

Oct. 6-8—FIREMEN'S ASSOCIATION OF THE STATE OF PENNSYLVANIA. 57th Annual Convention, Williamsport, Pa. Secretary, Chief Charles E. Clark, Wayne, Pa.

Oct. 13-15—ILLINOIS FIREMEN'S ASSOCIATION. 49th Annual Convention, Pekin, Ill. Secretary, Assistant Chief Roy W. Alsip, Fire Department, Champaign, Ill.

Oct. 24-26—INTERNATIONAL ASSOCIATION OF POLICE AND FIRE SURGEONS. Annual Convention, New Haven, Conn.

Oct. 28—FIRE CHIEFS EMERGENCY PLAN OF FAIRFIELD COUNTY. Next Meeting, Nichols, Conn. Secretary, Lieut. John Moehring, Toms Road, Stamford, Conn.

## Illinois Holds Short School

The twelfth annual fire college of the Illinois Firemen's Association was conducted June 9-12 at the University of Illinois with an enrollment of 453 persons. Students came from seven states and 130 communities. Even fifteen city officials took the course. The following lectures were given:

"Fires During 1935-6," Sherman V. Coultas, State Fire Marshal, Springfield, Ill.

"Health and Safety of the Firemen," Dr. H. P. Sullivan, Chief Surgeon, Chicago Fire Department.

"Legal Rights of the Fireman Outside His Community," Simon Kellerman, 3rd, Attorney, Illinois Firemen's Association.

"Fumigation," C. M. Park, Engineer, Mutual Fire Prevention Bureau, Association of Mill and Elevator Mutual Insurance Companies.

"Dust Exulosions During Fire Fighting," Hylton R. Brown, Engineer, Chemical Engineering Division, Bureau of Chemistry and Soils, U. S. Department of Agriculture.

"Spending Your Time Between Fires," Anthony Mullaney, Deputy Chief Fire Marshal, Chicago Fire Department.

On the second and third days, the school was divided into groups consisting of work for paid and for volunteer departments.

For the paid departments, the work consisted of studies of the various types of pumps, and the hydraulics of fire lines, given under the direction of Clarence Goldsmith, Assistant Chief Engineer, National Board of Fire Underwriters. Chief Harry K. Rogers, had charge of evolutions and first aid, and gave instruction in hose, ladders, and rope work. Chief J. W. Just spoke on "The Fire Department and its Relation to Industrial Protection," and Chief Frank C. McAuliffe, Chicago Fire Insurance Patrol, gave a talk on "Fire Prevention in the Public Schools."

For the volunteer departments, instruction was given at the training tower under the direction of Chief Waldo Erickson, Western Springs; Chief Charles J. Foucek, Naperville; Assistant Chief Elmer Dicke, Downers Grove.

Assistant Chief John Enthrop, Midlothian, spoke on "Volunteer Department Organization," and R. E. Whalen, Fire Marshal, Elgin, lectured on "Standard Equipment for the Department."

An inspectors' school was in charge of Chief Walter A. Finklein, Belleville.

At a combined session of paid and volunteer departments, Harry K. Rogers, Chief Engineer, Fire Prevention Department, Western Actuarial Bureau, gave "An Analysis of Fire Department Organization."

In addition to the school sessions, there were two baseball games for the entertainment of the men, and open forum discussions in the evening.

The school was under the direction of L. H. Provine, Urbana.

## Oklahoma Firemen Meet

Norris Spradling, of Tulsa, was elected President of the Oklahoma State Firemen's Association at the annual forty-second convention held at Enid, June 1 to 3. The other officers are Sid Bean, Tahlequah, Vice-President; Charles Slemp, re-elected Secretary-Treasurer. The new board members are Hardin White, Altus, and W. M. Allison, Hominy.

The next convention will be held at Oklahoma City.

## Iowa Firemen Meet at Ames

Greater vigilance to curb any possible spread of arson was urged by J. Vincent Pyles, State Fire Marshal, in his address before those gathered for the twelfth annual Iowa fire school at the state college at Ames, May 26 to 29.

Richard E. Vernor, Manager, Western Actuarial Bureau, Chicago, said that firemanship is no longer a display of brute strength, but that it is an engineering science. He explained that five-year college courses are now available in fire protection engineering, and in Oklahoma City alone there are ninety men in the Fire Department with some engineering training.

E. S. Baird, of the Engineering Extension Service, gave a demonstration of first aid for firemen. Chief J. W. Just, Western Actuarial Bureau, Chicago, Chief Wright Hedger, Atlantic, and members of the Atlantic Fire Department, demonstrated fire salvage operations.

Fred P. Higgins, Assistant Fire Marshal, Grand Rapids, Mich., told how that city reduced its fire losses. Others on the program were Chiefs H. J. Callahan, Fort Dodge; E. P. Kohout, Cedar Rapids, and Dolph Becker, Oelwein, President of the Iowa Firemen's Association.

The Eldorado Fire Department demonstrated training methods for volunteer firemen.

Ninety-six firemen were granted awards for four-year participation in the annual school.

Officers of the Iowa Fire Chiefs' Association, reelected for next year, are Joe Dobson, Keokuk, President; Wright Hedges, Atlantic, Vice-President; L. R. Morris, Ames, Secretary-Treasurer.

# FALSE ALARMS

### ONCE ENOUGH

A big event had taken place in his family. He was a proud father. He was so excited he called up the Chief to tell him the news. But the Chief was out and some fellow in his office answered the phone. The happy father tried to report that he was the proud father of twins.

The one who answered the phone, didn't get the message.

"Will you please repeat that?"

"Not if I can help it," was the answer.

---

When a couple kiss and make up, the girl gets the kiss, and the fellow, the makeup.

---

### RETALIATION

Out in California, the story is told of a young Chinese servant who was engaged to clean up at the station, and look after things in general. He was quiet, obedient and non-complaining.

The first night they nailed his shoes to the floor. The next morning he went about his duties without a word of reproach.

The following evening, sand was put in his bed. Still the same expressionless face as he went about his work. The men decided that since he was such a good sport, they would play no more tricks on him. They told him the good news.

"No more nailee shoe to floor?" he remarked.

"No."

"No more putee sand in bed."

"No."

"Velly well, me no more spit in coffee."

---

There is little danger of forest fires where the only sap present is in the trees.

---

### WELL FED

The Captain was the center of interest when he returned to the station after his honeymoon to Bermuda. He was asked all about the trip.

"Did they feed you well?" some one inquired.

"Six meals a day," he answered.

When he saw that his questioner was somewhat doubtful, he continued, "Three down and three up."

---

Broad-mindedness is the ability to smile when you suddenly discover that your friend and your girl are missing from the dance floor.

---

### PRODUCTIVE

The station was an old frame building. It had been erected many years ago, and although it was scheduled to be replaced, no funds were available for the improvement.

An exterminator, looking for work, called at the station. As a means of starting his sales talk, he said to the desk man, "Nice place you have here. Is it free from cockroaches?"

"There isn't a single one around."

The fellow who was under the truck making adjustments was heard to chuckle.

"Correct," said the mechanic, "they're all married and have children."

---

A "sugar daddy" is a form of crystallized sap.

---

### LARGE ODDS

Central Station, since it adjoined the municipal offices, was the headquarters, in the evening, for all the politicians and would be office-holders in the town.

A candidate for the Council dropped in for a chat with the boys. One fellow who was unusually frank told the candidate that his chances for election were not so good.

"Why not?" asked the candidate.

"People say you're illiterate.

"That's a lie," he shouted with considerable feeling. "I'm forty-eight years old and my mamma and papa celebrated their fiftieth wedding anniversary just two months ago."

---

All work and no play makes Jack, and lots of it.

---

### WRONG WORD

Before the judge appeared the fire inspector, with a very much darkened eye, and the corpulent Mrs. Murphy. The judge looked at them both.

"Tell me, Mrs. Murphy," said the judge, "why did you assault the fire inspector?"

"Sure, yer Honor," said Mrs.Murphy, "he called me an occupant."

*—Drawing by "Art" Espey*

"Water battle? I thought you said, 'Put on a water bottle'."

# *The Greatest Book on Fire Fighting ever published! Every fireman should have one.*

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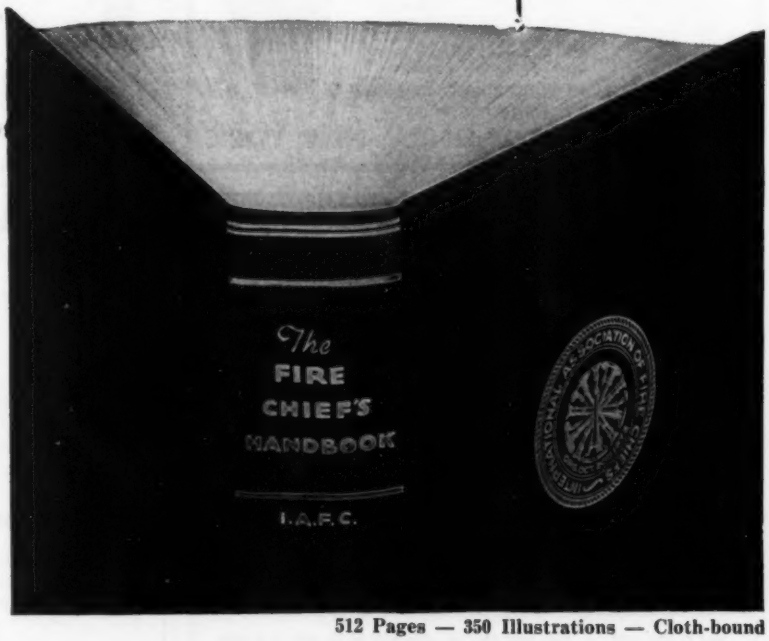


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FRANK MITCHELL,
Chief, Hudson Fire Department.

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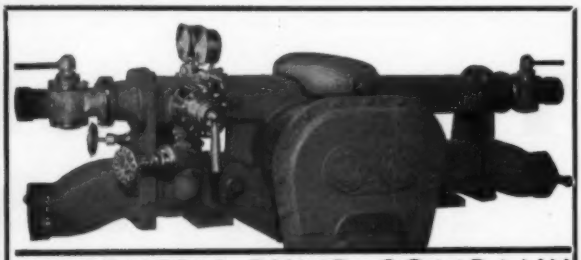

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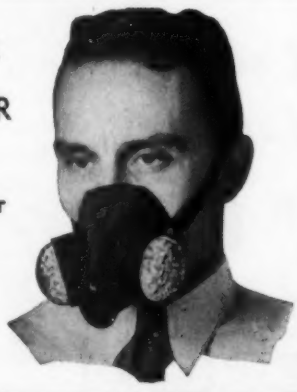

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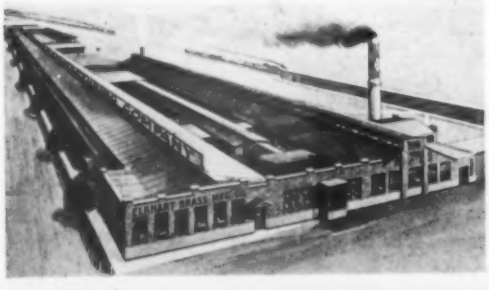

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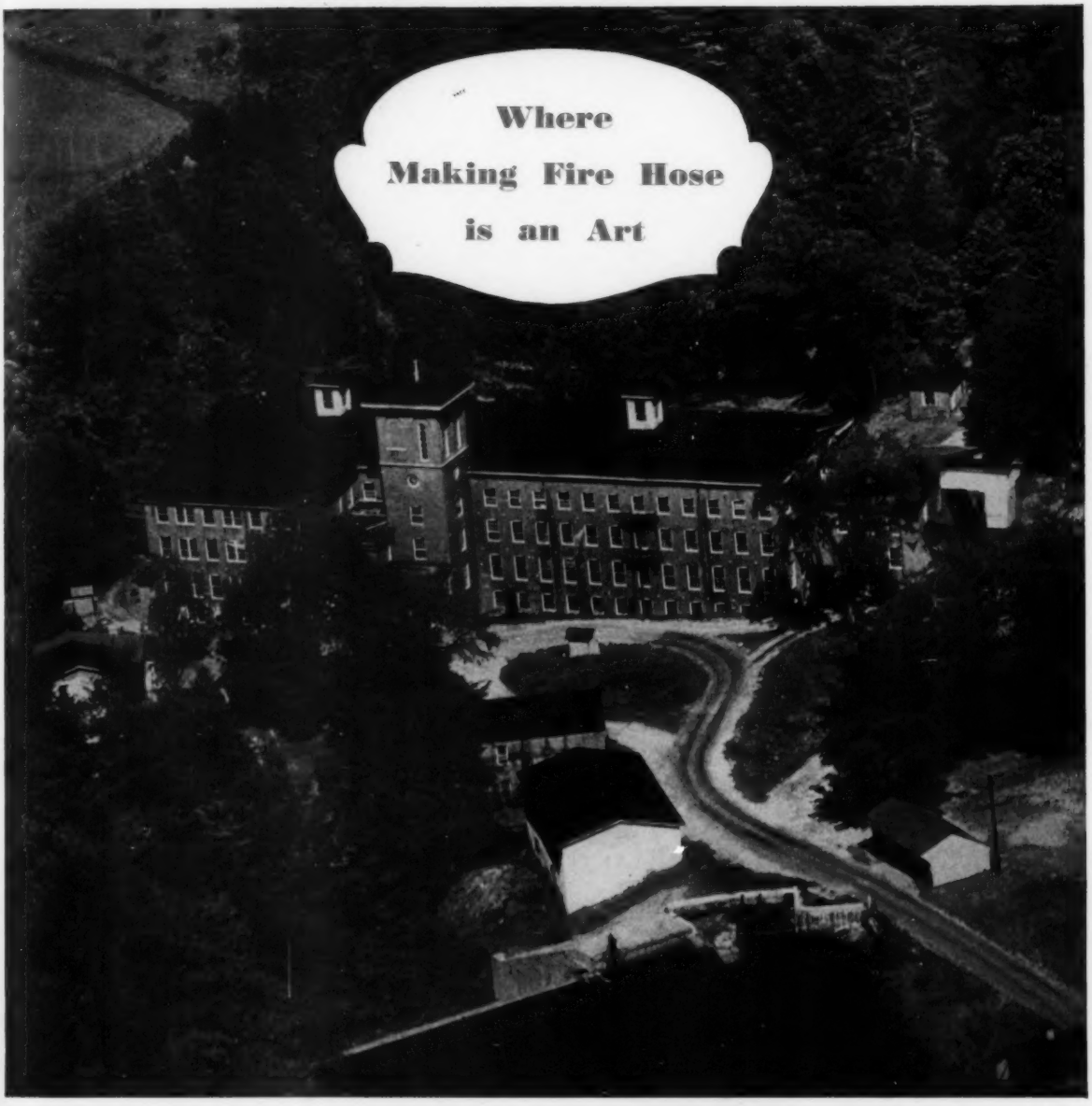


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